



Built by Mr. Louis C. Cyr, Lawrence, Mass. Machinery for Products Furnished by Us.

Concrete Products and How to Make Them

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Concrete Products *and* **How to Make Them**

THE measure of your success depends entirely upon the care with which you operate your machine, the preparation of the materials and the curing of the products.

If you operate your machine intelligently and follow the simple instructions and suggestions for making concrete materials given herein, you will secure the best results in every respect and meet with success.

Take Good Care of Your Concrete Machine or Mold

Clean it after each day's service and oil all parts needing it. Don't allow your machine to stand outside in the rain or in damp weather. Keep your machine rigid and all bolts well tightened. If allowed to become loose it will wear more rapidly and certain parts are more liable to break. At the end of each season's work paint the machine or mold, using a good grade of paint. By these means you can preserve the life of your machine for years.

See page 49 for index.

Sears, Roebuck and Co.
Chicago, Illinois

To Our Customers

We now number among our customers more than one-third of all the families in the United States, supplying a large majority of these families with practically everything they eat, wear or use—everything needed for personal use, for the home, the farm, the office or the factory. In buying from us these families are saving about fifteen million dollars annually, and this tremendous saving is matched by an equal advantage in quality, for it is the fundamental law of our business that quality must never be sacrificed to reduce price. We have the most highly perfected methods of buying, making and marketing ever devised by any business institution. We insure high quality and low price by our control of the source of supply, reaching back to the raw material in many lines, supplying carefully selected materials to factories either owned or controlled by us, watching every step in the making through the eyes of our trained experts—putting into the goods every possible improvement in quality, taking out of the manufacture every item of unnecessary cost.

We have adopted every idea, every device, every method of proved value in order that our patrons may enjoy the best possible service. We endeavor to give service that is even better than you might reasonably demand. Fair criticism of our service, our goods and our business methods is sincerely invited. In fact, we are largely dependent upon such criticism for the correction of errors and the improvement of our methods. When we receive criticism or complaint we not only adjust the difficulty specified, but we investigate the cause of the complaint and we take such steps as will make a repetition of the trouble unlikely. Our customers rightly expect the best goods, the best service, the best treatment. We desire to give you all these. We have endeavored to make the above statement so clear that our customers will fully understand our purposes and will feel free to bring any faults to our attention and be assured of prompt and satisfactory action.

SEARS, ROEBUCK AND CO., CHICAGO, ILL.

Concrete

Concrete, which is an artificial stone, is made by thoroughly mixing broken stone or gravel, clean coarse sand and Portland cement with a proper amount of water and allowing the whole to set or become hard.

The mixture, under favorable conditions, begins to stiffen or take its initial set in about an hour and becomes hard enough in ten to twenty-four hours so an impression can barely be made in it by pressure with the fingers. The time required for setting depends upon the weather and local conditions.

Concrete will set quickest in warm weather, and slowest in cold damp weather.

Do not try to hurry the hardening process by placing concrete in the sun, drying winds or near artificial heat. It will weaken it and make a very poor product. Remember that drying concrete products quickly makes a very poor product. To make a strong product the concrete should be kept thoroughly moist for several days so that the cement will crystallize properly and attain its proper strength. We tell you more about this subject on pages 35 to 37 under the heading "Curing Concrete Products."

The Selection of Materials

CEMENT.

Cement fit for use in concrete building materials may vary in quality, and as there are many excellent brands on the market you should exercise care to see that you are getting the right quality. It is best to purchase your supply from a reliable and trustworthy dealer, even though it costs a trifle more.

Any brand of Portland cement which is guaranteed by the manufacturers to pass the standard specifications of the United States Government and American Society of Civil Engineers will be satisfactory to use. Your supply dealer can tell you if it will pass the inspection.

STORING CEMENT.

Store your cement supply where it will be protected from the weather. Do not pile cement directly on the ground or on a concrete or stone floor. Always pile it on a wood platform built about 6 inches above the ground so there is no possible chance for it to become wet. Do not pile it too high, and have pile self supporting by crossings layers. Do not pile against side of building. Cement should be thoroughly protected from dampness, as this is the only element which will injure it. If by chance cement should become slightly dampened, lumps will form, and these must be thrown out, as they are worthless. Do not use any lumps that may be in cement unless they are lumps caused by pressure and can be crumbled into a powder by a light blow of the shovel.

OTHER INGREDIENTS OF CONCRETE.

The definitions below will be of great help to the inexperienced in properly selecting materials for concrete work. These specifications have been adopted by the Concrete Block Machine Manufacturing Association for the manufacture of concrete blocks, brick, posts, tile, etc.

AGGREGATE.

Any material such as crushed stone, gravel or cinders used with cement and sand in making concrete is called the aggregate. The aggregate is the larger proportion and is used for the purpose of reducing the cost and adding to the strength of the finished concrete.

VOIDS.

The space existing between the particles of sand, crushed stone, gravel or other aggregates is called the voids.

SAND.

Sand is such material as will pass through a screen with meshes $\frac{3}{4}$ inch square and be retained on a screen with meshes 1-64 inch square. This applies to sand obtained from a river, lake shore or sand bank, and to fine screenings

from a stone crusher. Sand suitable for concrete work should not be finer than above described, and the sharper and the more irregular the grains the better adapted it is for concrete work. Sometimes it is necessary to use fine sand because no other can be had. In such cases more cement must be used so all grains of sand are coated with it. Coarse sand will make a stronger concrete with less cement than fine sand. Sand must be free from loam or other foreign material and must not contain any perceptible amount of clay or other soluble matter. The material known among sand and gravel dealers as No. 2 Washed Torpedo Sand is the most satisfactory sand to use. In the following paragraphs we mention three methods of testing sand, so if there is any doubt as to the quality of the sand available for your use you may test it yourself. For ordinary purposes No. 1 or No. 2 test will answer all requirements. However, for the benefit of those who want to make a more extensive test we recommend No. 3. While this requires some time to make, it is the most reliable method and the results are very satisfactory.

TESTS FOR CLEAN SAND.

No. 1 Test. Take a double handful of moist sand from the bank, open the hands and rub the sand lightly between them, allowing the sand to slip quickly between the hands. Repeat this operation five or six times and rub the hands lightly to remove the fine grains of sand which adhere to them. Then examine the fingers closely, and if a thin film of sticky matter remains do not use the sand, as it contains loam. A further test is to scrape some of this matter from the fingers with the end of a penknife and take a little of it between the teeth. If it does not feel gritty or sharp it indicates vegetable loam, and it is not advisable to use this sand under any circumstances without washing it thoroughly to free it from loam and dirt.

No. 2 Test. Put 4 inches of sand in a glass jar or large bottle. Then add clean water to fill jar or bottle about three-quarters full. Shake this thoroughly until sand is practically held in solution. Set bottle away where it will not be disturbed for at least two hours and allow contents to settle. When thoroughly settled, examine top of sand carefully. A layer of dissolved clay, loam or mud will settle on top of the sand. If this layer is more than $\frac{3}{8}$ to $\frac{1}{2}$ inch thick do not use the sand for concrete work until it has been properly washed.

No. 3 Test. Make up two small blocks of concrete about 6 inches square and 6 inches thick, using the same cement, sand and gravel as will be used in your work. Cover with a moistened cloth and keep moist for three days. Keep one block out in the air for seven days and the other in a fairly warm room. After twenty-four hours the specimen set in the warm room should be hard enough so that it will bear pressure of the thumb without indentation. The specimen set outside should be hard enough to remove from the mold in twenty-four hours in ordinary mild weather or forty-eight hours in cold damp weather. At the end of the seven days test both blocks by hitting them with a light hammer. If the hammer does not dent them with blows such as would be used for driving tacks, and the blocks sound hard, the sand as a rule is all right to use, otherwise it is best to discard it. If you have any reason to doubt the quality of the sand and you intend to use it extensively, it is always best to submit it to some society for testing concrete materials and get its report.

TO WASH SAND.

Sand which is not too fine and which contains earth or loam can be satisfactorily washed in a washing rack or screened trough built as follows:

Make a box similar to a mortar box, but without a bottom and with only one end, 12 feet long, 4 to 6 feet wide and 12 to 18 inches deep. Put in a bottom of fine wire screening with about 60 meshes to the inch, supporting it by cleats placed close together so that the sand will not break through. This screen bottom should extend to about 1 foot from the end of framework having no end. This 1 foot should be boarded solid with 1-inch boards. Set this over a trough or ditch with end of screen bottom in a line with edge of the trough so water which runs through screen will run off through the trough or ditch. A box should be placed at end of washing rack so sand which runs off can be kept free from dirt. Mount the other end on a trestle or brace 5 feet higher than the lowest end of rack. This will give your washing rack a slope of 5 feet in 12 feet. Throw the sand on the upper end of the washer, and while so doing have water sprayed on it. The dirt and

very fine sand will run off through the screening with the water, while the clean coarse sand will run into the box at the bottom of the rack. This sand will make the best concrete. Stone crusher screenings can be washed in the same manner, which will free them from all dust and dirt.

GRAVEL.

Gravel is material obtained either from a sand bank or river and should be of such size as is retained on a screen having $\frac{1}{4}$ -inch mesh. Bank gravel is material obtained from a pit containing sand and gravel. Sometimes sand and gravel are found mixed in the proper proportions ready for concrete use, but it is always advisable to screen them and separate the sand from the gravel and then mix certain proportions of each as explained under "Proportions," pages 5 and 6. This will enable you to make the best concrete for the least cost.

The following standard sizes of sand and gravel are sold by most sand and gravel dealers:

No. 5 GRAVEL contains everything that passes through a $\frac{3}{8}$ -inch screen and is retained on a $\frac{1}{4}$ -inch screen. This gravel is suitable for brick and concrete products having thin walls. It is also used a great deal for roofing purposes.

No. 8 GRAVEL consists of all gravel that will pass through a $\frac{1}{4}$ -inch screen and is retained on a $\frac{3}{8}$ -inch screen. This is standard size used for concrete blocks and similar products, and for sidewalks, reinforced walls and the like.

No. 9 GRAVEL consists of all gravel that passes through a 2-inch screen and is retained on a $\frac{1}{4}$ -inch screen. This is ordinarily used for paving purposes only, as it is too large for use in general work.

Gravel is very apt to be coated with clay or vegetable loam, which will prevent the cement from sticking to it properly and the resulting concrete is very weak. Gravel should be tested and washed the same as sand, as explained on pages 3 and 4.

CRUSHED STONE.

This may be either granite or limestone and should be of such size as will pass through a $\frac{3}{4}$ -inch mesh screen and be retained on a $\frac{1}{4}$ -inch mesh screen. Crushed stone with a proportion of sharp clean sand makes one of the best concretes, due to its porous condition and sharp edges. It should be clean and free from dust.

CINDERS.

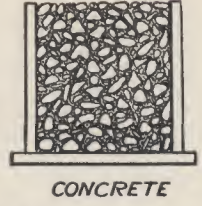
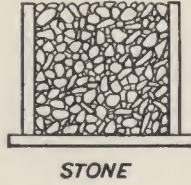
Cinders can be used in concrete work, but are not recommended as they are not as strong as stone or gravel. If they are used, slag cinders are the best, and they should be thoroughly cleaned to free them from all loose dust.

WATER.

The water used for mixing concrete must be clean. Do not take water from a stream or pond into which any waste from chemical mills, barns, etc., is run or into which refuse is dumped. If the water runs through alkali soil or contains vegetable matter, make up a block of concrete, using the questionable water, and see whether the cement sets properly. Sea water is not adapted for concrete work.

TO INSURE SUCCESS. Be sure to use perfectly clean materials and follow out our instructions for mixing, making and curing the product. To do this you may have to charge a little more for your product if you are making a business of concrete product manufacturing, but by advertising the fact that you use the best materials, cure your products properly and pay particular attention to the **quality** of your products, the business will soon come your way, even though your prices are a little higher than prices asked for the ordinary grade of work turned out by many concrete block makers. If you are making products for your own use, then it is to your own interest to make high quality products. Remember the old adage: "What is worth doing at all is worth doing well," and operate your concrete plant accordingly. If you do, success will be assured.

PROPORTIONS.



In making concrete it is very important that the materials, such as sand, gravel, crushed stone and cement, are properly proportioned; that is, the proper amount of each material must be used to obtain a mass with but little if any voids or open spaces between. For ordinary work use twice as much coarse aggregate (gravel or stone) as you use fine aggregate (sand) and twice as much sand or fine aggregate as cement; in other words, use one part of cement, two parts of sand and four parts of crushed stone or gravel. In calculating the amount of material to use for any piece of work do not figure that one barrel of cement, two barrels of sand and four barrels of stone will make seven barrels of concrete. In making concrete the sand should fill the spaces or voids between the stone, and the cement should fill the voids between the grains of sand, making a solid mass of but little more than the original quantity of stone. The illustration above shows this very nicely.

THE PROPER WAY TO PROPORTION.

To ascertain the correct proportions to use of cement, sand and gravel or crushed stone, what is called "the water test" is usually made as follows: Be sure that the materials to be tested are perfectly dry, because they have a greater volume when wet and your estimate will not be correct. Take a receptacle of a known capacity, a 2-quart or gallon jar, for instance. To test sand fill jar completely with sand, shaking it down as compactly as possible; level it off carefully, then pour in as much water as it will absorb, being sure to measure the water as you put it in so you will know exactly how much water has been poured into the jar with the sand. The quantity of water absorbed will indicate the space occupied by the voids, or the amount of cement it would be necessary to use to produce a solid concrete. You can test gravel or crushed stone in the same way, bearing in mind that the amount of water poured into the gravel will indicate the amount of cement and sand to be used for making a solid concrete. For example, we will assume that a 2-quart jar is used as a test jar. Fill this level full of sand as directed above. Use a graduated measure of some kind to measure the water, which should be poured in the sand slowly. Assuming it requires just one quart of water to fill the jar, the proper proportions would be twice as much sand as cement or, as it is commonly termed, two parts sand to one part cement.

Now thoroughly clean and dry the jar and fill it level full with the gravel or stone you intend to use. Measure and pour in water in the same manner as before. Assuming that it again requires one quart of water to fill the jar, the correct proportions will be twice as much gravel as sand, commonly termed four parts.

The proper mixture to use would therefore be one part cement, two parts sand and four parts gravel.

The gravel or crushed stone not only reduces the cost of the concrete but makes a better concrete than sand and cement; in fact, sand and cement do not make a good concrete at all unless a very large proportion of cement is used, and we do not recommend the making of concrete products (except tile or brick) of a sand and cement mixture. Stronger products and better results are obtained when a properly graded mixture of cement, sand and gravel or crushed stone is used.

There are a number of standard proportions to use which will give fairly satisfactory results, but by making the water test and proportioning your materials accordingly you are sure of the very best results.

It makes no difference what aggregates are used, the voids exist in them all. The voids in sand are very small, but the voids when gravel or crushed stone is used are very large. In order to measure the quantity of cement

necessary to be used for a correctly proportioned mixture it is well to determine the total void space by the water test, as it will require enough cement to replace all the voids existing. It is advisable, therefore, when using gravel or crushed stone to mix it with fine gravel or a sharp and gritty sand and thus diminish the voids as much as possible. A mixture of this kind requires less cement because a large share of the voids will thus be filled by the sand or fine gravel. In making up a concrete mixture bear in mind that your finished concrete will be no stronger than the weakest aggregate you put in it. Also bear in mind that cement merely cements the various aggregates together. Cement does not have the property of causing whatever material it is mixed with to become hard like stone.

A bag of cement contains a little less than a cubic foot. In order that you may measure your sand and gravel properly it is best to make a bottomless box which when filled level to the top holds a certain amount. A box 12x12x11½ inches will hold one bag of cement. When using a standard mixture, one part cement, two parts sand and four parts of crushed stone or gravel, make your sand box 12x24x11½ inches, which will hold two parts, and your gravel or crushed stone box 12x48x11½ inches, which will hold four parts. These sizes are correct for a one-bag batch proportioned 1, 2 and 4. It is, of course, possible to measure by the wheelbarrow load, but it is not advisable to do this, as it is almost impossible to load each wheelbarrow exactly the same and therefore one batch will vary from the other, with the result that your product will not be the same color or of the same strength. **DON'T GUESS** in proportioning concrete any more than you would expect your druggist to guess in compounding a prescription. Measure your materials and you not only guard against using too much cement but you are sure of making a uniform and good product.

STANDARD PROPORTIONS.

We give below a number of standard proportions for mixing concrete of various materials suitable for concrete work. These mixtures make up what is commonly known as 1 to 6 concrete, meaning that one part of cement to six parts of sand and gravel or aggregate is used. For cheap work you can use a 1 to 7 mixture, adding one-half part to sand and one-half part to the crushed stone, gravel or other coarse aggregate used. We recommend a fairly rich mixture, however, as it makes a better concrete at but slightly additional cost.

Proportions when sand and gravel are used: Use one part of good Portland cement and two parts of clean, sharp and gritty sand to four parts of clean and sharp gravel.

Proportions when sand and crushed stone are used: Use one part of good Portland cement, two parts of clean, sharp and gritty sand and four parts of crushed stone.

Proportions when sand, gravel and crushed stone are used: Use one part of good Portland cement, two parts of clean, sharp and gritty sand, two parts of clean gravel and two parts of crushed stone.

Proportions when sand, cinders and crushed stone are used: Use one part of good Portland cement, two parts of clean, sharp and gritty sand, one part of clean cinders and three parts of crushed stone.

A good mixture for average concrete products when sand and gravel or crushed stone are well graded in size is one part good Portland cement, two parts clean sharp sand and four parts clean crushed stone or gravel.

If when making products of any of the above proportions you find a large number of open pockets, use a little more sand and less stone or other large aggregate than called for.

FACING CONCRETE PRODUCTS.

As a general rule concrete products are faced; that is, the face of the product is made of a richer and finer mixture than is used for making the body of the product. This makes the product more waterproof and gives it a better appearance. Facing material is made of sand and cement only and the proportions are one part of good Portland cement to one or two parts of clean sharp sand. Mix this dry until it has a uniform color. Then dampen it slightly; get just enough water in the mixture so it will hold together when you squeeze it in the hand but not show moisture on the

surface. Do not make your facing material too wet or it will stick to the face plate; it should be what is commonly called semi-dry. The facing will absorb enough water from the backing material to insure perfect crystallization in curing the product, as explained on pages 33 to 35.

You can mix up a large quantity of facing material, provided the sand is perfectly dry. Do not moisten all of this mixture at once, however, but take about as much as you can use up within a half hour and moisten this. Facing material commences to set shortly after water is added and the face of the product will crack or check if the material is allowed to partly set and is then worked over.

Most concrete products are made face down, so that it is a simple matter to spread from $\frac{1}{4}$ to $\frac{3}{4}$ inch of facing material over the face plate. To face a product that is made side face the facing material is usually placed against the plate by hand, padding it on to the desired thickness and following up with the backing material to hold it in place. In some instances it will be found advisable to use a plate of sheet steel, which can be held about $\frac{3}{4}$ inch from the face plate. The facing material is dropped between the face plate and this sheet of steel and is held up by hand until the backing material is placed. This sheet of steel is then withdrawn and the material tamped thoroughly.

COLORED FACING. There are many ways to make concrete products with colored facing. However, there is only one kind of material to use for making a permanent colored facing, and this material is a pure mineral color. Ordinary dry colors, commonly used for mixing paints or kalsomine, give you results, but the colors are not lasting. To use the mineral coloring matter it is first mixed in the proper proportion with the cement, making a colored cement. This colored cement is then mixed with sand or other material used for facing, just the same as if it were not colored. We handle a very complete line of mineral colors in the various shades and these are listed below and on the following page.

In order to insure your product having the same color it is necessary that the cement coloring matter, sand or other material used should be mixed in proper proportions for each batch. It is hard to do this accurately by measure, particularly in the case of cement and mineral color, because the bulk is not always the same. The best way will be to weigh out the colors and mix up a full bag batch of cement and coloring. Then carefully measure out your sand or other material used for facing and weigh the amount of cement used with this sand instead of measuring it. In this way you can make each batch mixed alike and the product will then be all the same color.

From $\frac{1}{4}$ to $\frac{1}{2}$ -inch facing is sufficient to color the face deep enough for permanent results. One hundred pounds of colored cement mixed one part cement to two parts of sand will make sufficient colored facing material to face 105 8x8x16-inch concrete blocks. The same mixture described above will face 840 2x4x8-inch concrete bricks.

MINERAL COLORS FOR CONCRETE WORK.

No. 30M2392 Extra Red Oxide. This color is the brightest and lightest red we handle, also the most expensive oxide for concrete coloring purposes, owing to the great strength and coloring properties it contains, and is mostly used by concrete building block manufacturers in coloring brick. Requires about 10 pounds to every 100 pounds of cement and gives a bright red color to a concrete mixture.

No. 30M2391 Red. This is a very strong, natural hematite red of very brilliant color and will give a good deep, high colored red when mixed with cement. Requires about 12 pounds to every 100 pounds of cement.

No. 30M2390 Red. This is a red oxide of iron of lighter color than the above mentioned and will produce a medium shade of red. Requires about 15 pounds to every 100 pounds of cement.

No. 30M2393 Brown. This is a natural brown of very good coloring properties and produces a deep, rich brown color when mixed with cement. Requires about 20 pounds to every 100 pounds of cement.

No. 30M2394 Yellow. This is a good strong domestic yellow and can be used to good advantage in making a light buff colored concrete brick, where a lighter shade is desired than that produced by the following yellow color. Requires about 15 pounds to every 100 pounds of cement.

No. 30M2395 Extra Yellow. This color is used for making a light and dark yellow brick, leaning toward the buff shade, and is very much used by concrete building block manufacturers. This color can be varied and deepened by the addition of any of the red oxides and in this way produces a very rich effect. Requires about 15 pounds to every 100 pounds of cement.

No. 30M2396 Lampblack. This is one of the strongest blacks known and is absolutely permanent on concrete work. While the cost per pound is somewhat high, its coloring properties overbalance this feature. Requires about 2½ pounds to 100 pounds of cement.

No. 30M2397 Carbon Black. A black mineral containing a percentage of pure carbon black. It is considerably heavier than lampblack and is not quite as strong in coloring properties.

COMBINATION SHADES. By manipulating the above colors in various combinations some very pleasing effects can be had. This, of course, must be gained by experiments of your own.

PRICE LIST PURE MINERAL COLORS FOR CONCRETE.

Catalog No.	Color	Price, per Barrel	Price, per 100 Pounds	Price, per Pound
30M2390	Red, 325-pound barrels.....	\$ 6.50	\$ 2.50	3c
30M2391	Red, 600-pound barrels.....	19.50	3.75	4c
30M2392	Extra Red, 400-pound barrels.....	52.00	13.50	14c
30M2393	Brown, 300-pound barrels.....	6.00	2.50	3c
30M2394	Yellow, 350-pound barrels.....	8.75	3.00	3½c
30M2395	Extra Yellow, 350-pound barrels...	14.00	4.50	5c
30M2396	Lampblack, 30-pound barrels.....	4.50		18c
30M2397	Carbon Black, 200-pound barrels...	10.00	6.50	7c

WHITE FACING. To make white facing use one part pure white Portland cement to two parts of clean sharp white marble dust, white sand or clean limestone screenings that have been passed through a ⅛-inch mesh screen.

Pure white Portland cement can be obtained from almost any dealer in cement, or he can at least advise you where to get it. The cost is a little more than the regular cement, but the added beauty of the finished product is well worth the slight additional cost.

GRANITE FACING. A finish equal to natural cut granite can be obtained with the use of Mica Spar Crystals and cement. There are several ways of using this material but the results are all the same. The material used should be well graded and consist of enough fine particles to fill the voids which may exist where you desire to use a portion of coarse particles. The sizes to use depends on individual taste. Some prefer a granite face made up of fine particles, such as Nos. 3½ to 5, illustrated on page 9, while others prefer the use of particles as coarse as Nos. 2 and 3. For general use we recommend a mixture of six parts No. 2 grade, five parts No. 3 grade, four parts No. 3½ grade, two parts No. 4 grade and two parts No. 5 grade; all thoroughly mixed together. Then take three parts of this mixture and add one part of either gray, white or colored Portland cement. Dampen this and handle just the same as plain facing. To bring out the natural color and beauty of the facing material it is necessary to remove the film of cement. This can be done in several ways.

First Method: Washing with acid solution. Allow product to set for about twenty-four hours. Prepare a solution of one part muriatic acid and three to five parts water. Apply this solution to the face of the product with a soft brush, and as soon as the natural stone is exposed wash with a liberal application of clean water. Care should be taken to wash away all the acid solution so it will not eat down into the cement.

Second Method: Use of abrasive material. A thorough rubbing with a board and plenty of wet sharp sand will remove the cement quickly. A block of carborundum is also very effective. Finish up by a thorough cleaning with water.

Third Method: Scrubbing while green. This method is very effective but requires considerable judgment. The cement is scrubbed off with brush and water shortly after it has commenced to set. If this is done before the cement has set sufficiently the material will scrub off, but if the cement has set too long it will not be possible to remove the cement.

Fourth Method: Spraying. This is a comparatively new method of finishing concrete work but it has proven quick and effective. It is necessary to have running water or water under pressure and a misty spray nozzle, such as is used for spraying trees and plants with insecticides.

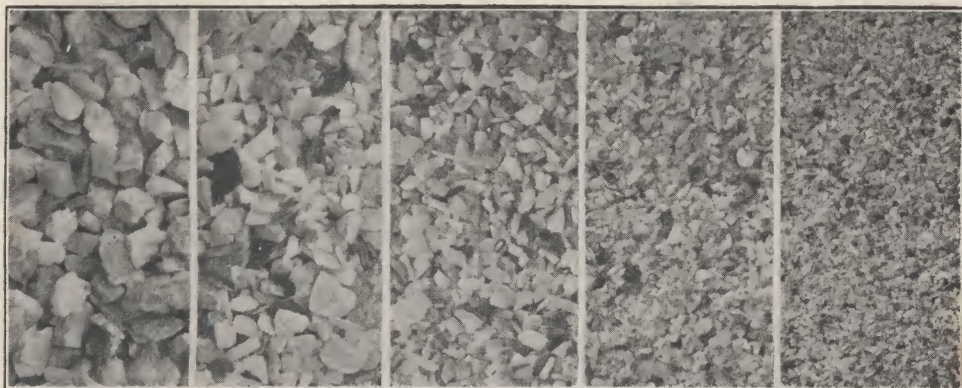
Within five to ten minutes after the concrete has been tamped and removed from the form it is sprayed with water from a misty spray nozzle held about 4 to 6 feet from the face. The nozzle must not be directed to one spot but should be in motion while the spray is applied. It will be noted that the spray washes the cement from the facing aggregate, but instead of running off it runs down into the crevices between the aggregate. Care must be taken not to spray too long. A little experience will enable you to do perfect work.

We can furnish a suitable spray nozzle with automatic shut off.

No. 44M5519 Spray Nozzle for concrete work. Price.....\$1.00

MICA SPAR CRYSTALS.

We can ship from CHICAGO, ILL., or CROWN POINT, N. Y.



No. 44M6140 No. 2 Size.	No. 44M6141 No. 3 Size.	No. 44M6142 No. 3½ Size.	No. 44M6143 No. 4 Size.	No. 44M6144 No. 5 Size.
Price, per 100-pound bag.....	Price, per 100-pound bag.....	Price, per 100-pound bag.....	Price, per 100-pound bag.....	Price, per 100-pound bag.....
58c	59c	60c	62c	63c

Good results can also be had by using crushed granite rock or marble chips of various colors. These materials should be handled the same as Mica Spar.

PEBBLE FACING. By using pebbles of various colors, ranging in size from ¼ to ¾ inch, with a portion of sand and cement, and cleaning with acid solution or spraying as already described, you can make a very handsome natural pebble facing which may be used for a number of purposes to good advantage. Pebbles used for facing must be perfectly clean.

Mixing Concrete

DON'T MIX UP TOO MUCH AT ONE TIME.

Do not mix more concrete at one time than you can use within thirty to forty minutes, because the cement commences to set as soon as water is added and if allowed to stand for a couple of hours a great deal of the strength is lost. About 3½ cubic feet of concrete will be sufficient to make nine blocks 8x8x16 inches in size and will require from twenty to forty minutes to make for one or two men.

Concrete materials can be mixed on any clean floor, or if you work outside, as is usually the case, it is advisable to build a mixing platform about 10 feet square of matched lumber with all joints tight to prevent the cement from washing through when water is applied. For a permanent location we would recommend that you build your mixing platform of concrete, leveling it off carefully and throwing up a ledge about 2 inches high on all sides. Have the mixing platform placed so that your supply of sand, gravel and cement can be stored near it, saving time and labor in getting materials to the board. First measure out your sand and spread it out evenly on the board in a layer 4 to 6

inches thick, then put the cement on top of the sand, spreading it out evenly. Start at one end of the pile and shovel the sand and cement over from one side to the other two or three times until it is perfectly uniform in color, or in other words until it is thoroughly mixed. Stroke the back of your shovel across the material. This will smooth the surface and show up any irregularity in the color. When the sand and cement are thoroughly mixed spread it out carefully and level it off; put your stone measuring box on top of the material and measure off the proper quantity of stone. Do not apply water until you have shoveled this over two or three times and the stone is thoroughly mixed with the sand and cement. When the sand, cement and stone are thoroughly mixed, add water with a sprinkling can or spray it on with a hose, and be careful not to put on too much at a time; keep the water in the center of the pile, because if it runs off near the edges it will wash away some of the cement. Add water to the dry spots as they show up and mix thoroughly, shoveling the entire mass over and over until it is of uniform consistency and just wet enough to show moisture when squeezed in the hand.

In our face down machines you can use a wetter mixture than in side face machines, because the cores are not withdrawn until the block has been turned over. The idea is to get your backing material as wet as possible and still not have it stick to the walls of the flask or mold. In many machines the cores are withdrawn horizontally; this permits the material to collapse before you get the block turned over. This will not occur when using our **Knox, Triumph or Wizard Block Machines** because the core is not pulled out until the block is turned over. The consistency of your mixture can best be determined by experience. Make it as wet as you can and still have it hold its shape when released from the machine. If too wet it will stick to the plates of the machine or mold.

Be sure to use clean water and mix thoroughly, otherwise you cannot expect good results. As soon as your mixture is moistened use it as quickly as possible. Do not allow it to lay over during the lunch hour or for some other reason, but use it immediately after mixing and before the initial set of the cement takes place.

If you do not use a hose it is advisable to measure the water applied to the batch and then apply this same quantity to each batch, so that every batch will be of the same consistency. Be careful not to mix up too much material at one time, because a great deal of the strength of the concrete is lost if it is disturbed after the cement commences to set, which takes place almost immediately after the water is added. Our **Wizard Concrete Block Machine**, 8x8x16 inches in size, operated by two men, will use on an average $4\frac{1}{2}$ to 5 cubic feet in from twenty to thirty minutes. One bag of cement used in a mixture of 1, 2 and 4, that is, one part cement, two parts sand and four parts gravel or crushed stone, will make about $4\frac{1}{2}$ cubic feet of concrete, or about twelve and one-half blocks 8x8x16 inches in size. If your materials are well graded this mixture will make good strong blocks or other products. Your measuring boxes for a mixture of this kind should be 12x48x11 $\frac{1}{2}$ inches for the crushed stone or gravel and 12x24x11 $\frac{1}{2}$ inches for the sand. To do away with the use of two boxes you can either put a partition exactly in the center of the large box or draw a line all the way around inside 5 $\frac{3}{4}$ inches from the bottom and use this as a guide for measuring the sand. As before stated, it is best to make the water test of the particular materials you have to use to determine the exact proportions of each material and make your measuring boxes accordingly.

MIXING BY MACHINERY.

Better mixing and more of it can be accomplished by using a concrete mixer. There are a variety of sizes and styles for sale and we show a complete line in our Concrete Machinery Catalog. For the small contractor or cement user our Farmers' Special or One-Minute Batch Mixer will answer very nicely. Both the hand and power styles are handled in the same way.

FARMERS' SPECIAL MIXER.

This is a very simple machine. The latch on the stand hooks over the crank, holding it stationary while loading. The gravel, sand and cement are placed in the drum in even layers in the order named. Water can be placed

in the drum before any of the other materials, or the materials can first be mixed in the dry state and water added later. About eight revolutions of the drum are sufficient to do a perfect job of mixing.

ONE-MINUTE BATCH MIXER.

TO LOAD. First put in the proper amount of gravel and spread it over the bottom of the drum. Then put in the sand and spread it over the gravel in an even layer. Lastly put in the cement, spreading it in an even layer also. The drum should then be turned for one minute at a speed of about fifteen revolutions per minute. Then put sufficient water in hopper and open valve. Turn drum while water is running into it through perforated pipe, which will insure even distribution of moisture. A little experience will enable you to get just the right quantity of water into each batch. To dump the batch, open lid and turn drum so opening is on bottom.

Do not overload the drum or the perforated water pipe will become clogged and prevent proper wetting of material. When through using, wash out drum with plenty of water and turn with opening down to drain.

Be sure to keep all bearings and gears clean and well oiled or greased. We recommend graphite grease.

BUCKEYE BATCH MIXERS.

These machines are so simple in construction and so perfect in operation that, other than a hint or two, no instructions for operating are needed.

The latch holding drum in position is adjustable. A little experience in using the mixer will demonstrate the proper angle to set the drum for perfect work on various sizes of batches and the consistency of the batch. For small batches of sand and cement mixture for facing or top dressing the best results can be had with drum almost horizontal. We have found that this mixer will do a quick, perfect job of mixing if the required amount of water is first thrown in the drum and this followed by the gravel, sand and cement in the order named.

Keep all bearings clean, well oiled or greased and tight. We recommend graphite grease. Clean machine thoroughly each day when through using. Plenty of water will do the work quickly and easily. Don't allow concrete to cake in the drum and then try to remove it with hammer and cold chisel. Wash it out with water before it hardens, and add years to the life of your mixer. Should a chain link break, the broken link can be slipped out by folding backward at joint and a new one inserted in like manner. The chain can be slipped over the sprockets with little labor.

Concrete Block Machines

For the benefit of those not familiar with a concrete block machine we give a description of the various parts.

FLASK. This is the complete mold box of the machine and is arranged so it can be opened and moved away from the finished block.

CORE. The mold or form which shapes the holes in the center of the block.

FLASK LATCHES. The levers which hold the parts of the flask together.

FACE PLATE. The plate forming the bottom of the flask in our face down machines and which shapes the face or front of the finished block.

FACE DOWN. The term used to indicate that the block is made face down. It is turned over on a pallet before the flask is opened.

PALLET. The part of flask which usually forms the front wall and on which the completed block is turned and carried away from the machine.

DESIGNS WE CAN FURNISH FOR OUR BLOCK MACHINES.

The illustrations below and on the following page were made from actual photographs of blocks made on our Wizard Machine. The face plates for our Knox and Triumph Block Machines and our porch molds will make products with face just as handsome. We show return corner blocks for the purpose of illustration, but to make return blocks you must have end gates, as shown in the price list of extras, for the particular size and kind of a machine you want the parts to fit. Most designs are reversible, so end gates are priced separately and are not included with the face plates unless ordered and price allowed. Right and left are always determined when standing in front of the machine, ready to operate it. As blocks are delivered with back to the operator a right hand end gate makes a return corner which is on the left when facing the block.

Be sure to order extra plates from price list of parts for your machine and tell us what machine the plates are for.

Face plates for fractional blocks can be furnished in various divisions as described below, unless otherwise specified.

Division Style A—Divided to make one half and two quarter blocks.

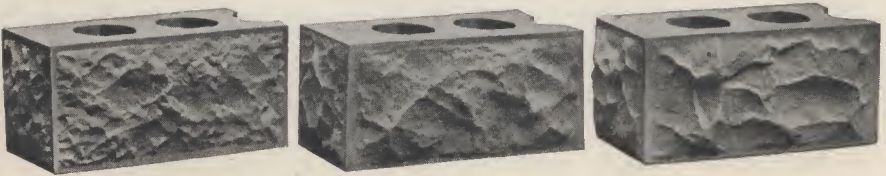
Division Style B—Divided to make two half blocks.

Division Style C—Divided to make one quarter and one three-quarter blocks.

Division Style D—16-inch plate divided to make one 2-inch, one 6-inch and one 8-inch block; 24-inch plate in Division D is divided to make one 8-inch block and one 16-inch block.

Division Style E—Divided to make full size block with half of face smooth for inside corners.

Division Style F—Full size plate with special division line for outside angle bay window blocks.

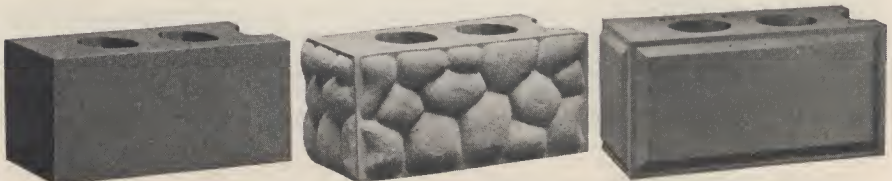


Design No. 1. Shallow Rock Face.

Design No. 2. Medium Rock Face.

Design No. 3. Heavy Rock Face.

These three designs are reversible, so only one end gate is required for either right or left return corner. Design 1 End Gate can be used with Design 2 and Design 2 End Gate with Design 3.



Design No. 4. Standard Plain Face.

Can be furnished in all Divisions. But one end gate needed.

Design No. 5. Cobblestone Face.

A fine "above ground" foundation block. 16-inch plate not made in Division D. Division F not made in any size. But one end gate required.

Design No. 6. Panel Face.

16-inch plate not made in Division D. But one end gate required.

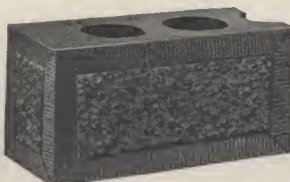
DESIGNS WE FURNISH FOR OUR BLOCK MACHINES.

See Instructions for Ordering on Page 12.



Design No. 7. Rock Face
With $1\frac{1}{2}$ -Inch Tooled Edge.

16-inch plate not made in Divisions C and D. Division F not made in any size. But one end gate required.



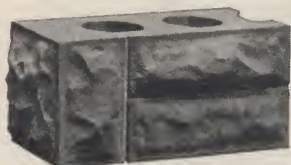
Design No. 8. Bush Hammer Face With $1\frac{1}{2}$ -Inch Tooled Edge.

16-inch plate not made in Divisions C and D. Division F not made in any size. But one end gate required.



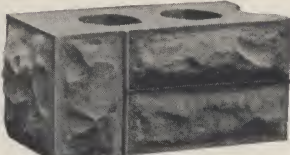
Design No. 9. Horizontal Tooled Face.

But one end gate required. A plain but pretty design that is easily laid up in the wall.



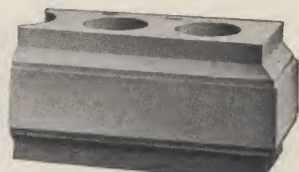
Design No. 10. Broken Ashler Face.

Block made with groove between block sections for beading or tuck pointing when wall is completed. For fractional blocks order desired division in Design No. 2, which matches this design perfectly. For right hand corner block use Design No. 2 end gate. For left hand corner special end gate is required.



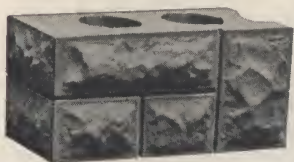
Design No. 17. Broken Ashler Face.

Block made with bead between sections. Does not require tuck pointing when laid up in wall. For fractional blocks order desired division in Design No. 2, which matches this design perfectly. For right hand corner block use Design No. 2 end gate. For left hand corner special end gate is required.



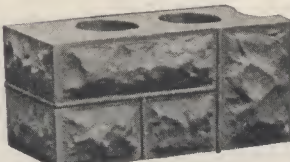
Design No. 12. Water Table Face.

No fractional face plate needed for fractional blocks in this design. End gate furnished is not fastened in like other end gates but sets in place and is supported by any plain end gate in machine. End gate is also used as a dividing plate for making fractional blocks of any length. But one end gate needed.



Design No. 11. Broken Ashler Face.

Block made with groove between block sections for beading or tuck pointing when wall is completed. For fractional blocks order desired division in Design No. 2, which matches this design perfectly. For left hand corner block use Design No. 2 end gate. For right hand corner special end gate is required.



Design No. 18. Broken Ashler Face.

Block made with bead between sections. Does not require tuck pointing when laid up in wall. For fractional blocks order desired division in Design No. 2, which matches this design perfectly. For left hand corner block use Design No. 2 end gate. For right hand corner special end gate is required.



Design No. 16. Pressed Brick Face.

Fractional plates not made in Divisions D and F. Both right and left hand end gates are required. This design makes a block that is a perfect imitation of several brick already laid up with the new scraped out mortar joints. Its straight lines make it an easy design to lay up in the wall.



Design No. 13. Ornamental Wreath Face.

Fractional plates not made in Divisions D and F. Both right and left end gates are required.



Design No. 14. Ornamental Scroll Face.

Fractional plates not made in Divisions D and F. Both right and left end gates are required.



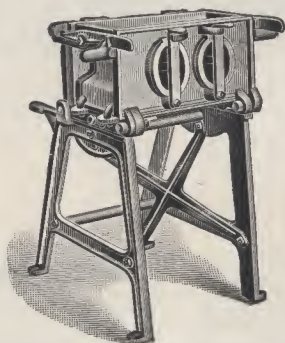
Design No. 15. Ornamental Rope Face.

Fractional plates not made in Divisions D and F. Both right and left end gates are required.

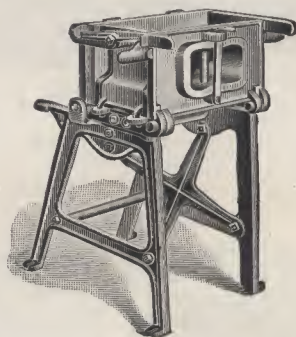
HOW TO OPERATE OUR CONCRETE BLOCK MACHINES.

WIZARD BLOCK MACHINE. We issue a separate book of instructions which gives full and complete information on the handling of the Wizard Concrete Block Machine. Be sure to read the directions before trying to operate the machine.

TRIUMPH BLOCK MACHINE.



Triumph Block Machine, Double Core.



Triumph Block Machine, Single Core.

When the machine reaches you it is all ready to make a standard block of rock face design with a half core impression at each end. Withdraw the core, and the machine is ready to receive the material. Throw a half shovelful of facing, mixed as directed on pages 6 and 7, into the bottom of the flask and spread it so that the face plate is covered with a layer $\frac{1}{4}$ to $\frac{1}{2}$ inch thick. The backing is made of cement, sand and gravel or other aggregate, mixed and proportioned as directed on pages 5, 6, 9 and 10. Fill the flask with backing material up to core openings and spread it evenly throughout the flask, then tamp this and put in the core. After you have the core entered put in enough of the coarser material to fill the flask.

TAMP THOROUGHLY. When tamping a block use the small end of the double end tamper and direct the force as far under the core and down in the corners as possible in a slanting position, so that the concrete material will crowd directly under the center of the core and insure proper strength in the block. After the block has been completely tamped smooth it off with the steel striker and a trowel if a perfectly smooth finish is desired.

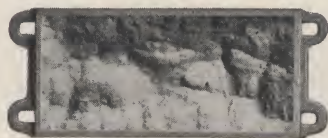
If rough back wall is wanted do not smooth off with the striker but scratch deep ridges in the block, as explained on page 24. The rough back block is used when it is desired to plaster directly upon the block or when a stucco finish is intended to be used on the outside wall.

TO RELEASE THE BLOCK. Grasp the handles on the back wall, hold end gate latches in position and turn the flask over so the pallet will be on the bottom. When doing this be careful not to let the flask down too hard, for if you give the block too great a jolt it is liable to crack when you finally release the machine. Then release the lever or latch holding the core and pull it straight up. Release the latches on the side and open the end gates back and away from the block as far as they will go. Grasp the handles on the top of the back wall and lift it up and back away from the block, at the same time holding the end gates open and carrying them back with the back wall. Be careful when you let the back wall down not to shake the machine. This operation should be watched carefully, as this is where a great many blocks are broken. Let the flask down easily and you will soon acquire the habit of doing it quickly and easily. After the block has been released it should be carried from the machine on the pallet and put to one side for curing. Leave the block on the pallet until it becomes hard enough to move, which will be in from twelve to twenty-four hours, depending upon weather conditions, as explained on pages 35 and 36. Place another pallet upon the front wall of the machine and be sure it is squared up properly, so that when the balance of the flask is locked it will close up true and square.

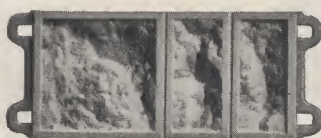
CLOSING THE MACHINE. Raise the front wall with pallet on it to a vertical position. See that ends of pallet line up with ends of face plate. Close the end gates and latch carefully. The machine is now ready for the facing material and entry of core as already explained. End gates of various designs can be squared up easily by use of washers on either side of latch where bolted on end gate.

TO CHANGE THE FACE PLATE. Lift the end gates out of the opening in the face plate. Loosen bolts holding face plate to rocker and take out plate. Put the desired plate in position, square it up properly with back wall and tighten bolts. Replace end gates. Front and back walls can be set in proper position by adjustment provided in two-piece arm or rocker to which face plate is bolted.

EXTRA FACE PLATES FOR TRIUMPH BLOCK MACHINES.



Whole Block Plate.



Fractional Block Plate.

Whole Block Plates are used for making regular 16-inch blocks. If block is to be used on a corner, a return

end gate must be ordered separately, as explained on page 12.

Circle Block Plates are curved plates and make a block with curved face, conforming to circles of 12 feet, 16 feet, 20 feet or 24 feet in diameter. We always furnish plate for 16-foot circles unless ordered differently.

Fractional Face Plates are used to make less than a full 16-inch block and can be furnished with dividing lines for fractional blocks as follows:

Division A—Divided to make two 4-inch blocks and one 8-inch block. This plate is illustrated above.

Division B—Divided to make two 8-inch blocks.

Division C—Divided to make one 4-inch block and one 12-inch block.

Division E—Divided to make full length block with one-half of face smooth for blocks to be used in inside corners.

We always furnish plate divided to make one half block and two quarter blocks unless you order otherwise.

All plates weigh about 15 pounds each and are shipped from factory in CENTRAL OHIO.

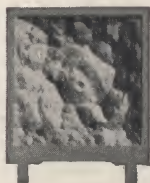
See designs on pages 12 and 13.

No. 44M5721 Whole Block Face Plate for Triumph Block Machine. Shipping weight, 15 pounds. State design wanted. Price.....\$1.19

No. 44M5722 Fractional Block Face Plate for Triumph Block Machine. Shipping weight, 15 pounds. State design and division wanted. Price.....\$1.20

No. 44M5723 Circle Block Face Plate for Triumph Block Machine. Shipping weight, 15 pounds. State design and diameter wanted. Price.....\$1.23

To make blocks for corner use it is necessary to have end gates that match the face plates. In many cases but one end gate is needed, as the blocks can be turned either way for right or left hand corners. Some designs are not reversible, however, and for these you require both right and left ends. Right and left are determined by facing the block machine in working position. Full information in regard to ends required for each design is given on pages 12 and 13.



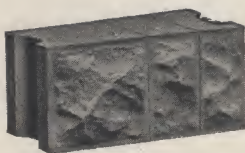
End Gate.

Be sure to tell us what size and design you want when you write your order. All end gates are shipped from factory in CENTRAL OHIO.

No. 44M5723 End Gate for 8x8x16-inch Triumph Block Machine. State design and whether right or left is wanted. Shipping weight, 7 pounds. Price75c

No. 44M5733 End Gate for 8x10x16-inch Triumph Block Machine. State design and whether right or left is wanted. Shipping weight, 9 pounds. Price85c

No. 44M5743 End Gate for 8x12x16-inch Triumph Block Machine. State design and whether right or left is wanted. Shipping weight, 11 pounds. Price98c

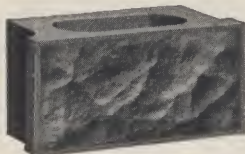


One filling of the mold makes one half block and two quarter blocks.

with the tamper, which

TO MAKE FRACTIONAL BLOCKS. Use the face plate that is divided by grooves across it, bolting it firmly to the rockers, the same as the face plate in the machine when you received it. Leave out the core and place the wall plug in the core aperture; then insert the division plates between the projecting lugs and in the slots on face plate, put in the concrete and tamp as before. The dividing plates are withdrawn before the flask is opened. After removing dividing plates take blocks out on pallet as already described. If the dividing plates stick, hit them a few light blows

will loosen them so they can be easily pulled out.



Rock Face Block with opening for joist.

TO MAKE JOIST BLOCKS. Place a joist block attachment on the upper part of each core end gate. This stops off about 1 inch on the back edge of the wall. When blocks are laid up a space is thus provided for 2-inch joists, 16 inches apart on centers.



Rock Face Gable Block.

TO MAKE GABLE BLOCKS. These can be made either whole or half size as desired. Use the face plate desired and one plain end door. Place the wall plug in core opening, as gable blocks are made solid. Put the gable dividing plate diagonally across the corner of the flask, one beveled edge in the corner formed by the plain end door and pallet, the other beveled edge against the back wall wherever it will touch.

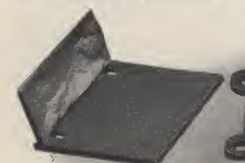


Outside Angle Block.



Inside Angle Block.

TO MAKE BLOCKS FOR BAY WINDOW CONSTRUCTION you require a special attachment as illustrated. The attachment consists of a special face plate and a special angle plate for making outside corner blocks. The angle plate is adjustable to any angle commonly used for bay windows. Nearly all bay windows are built at an angle of 45 degrees, and the attachment therefore is set for this angle. Inside corner blocks are made by using the regular half and



Triumph Bay Window Attachment.

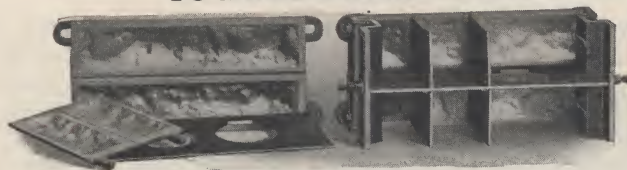
quarter plate in the machine, with one end of gable dividing plate resting in the outer groove and the other end resting on the end gate, making blocks as shown. Be sure to state design wanted and order the proper size. Shipped from factory in CENTRAL OHIO.

No. 44M5724 Bay Window Attachment for 8x8x16-inch Triumph Block Machine. Shipping weight, 30 pounds. Price.....\$2.25

No. 44M5734 Bay Window Attachment for 8x10x16-inch Triumph Block Machine. Shipping weight, 35 pounds. Price.....\$2.45

No. 44M5744 Bay Window Attachment for 8x12x16-inch Triumph Block Machine. Shipping weight, 40 pounds. Price.....\$2.65

TO MAKE 4-INCH COURSE BLOCKS.



Course Block Attachment.

Four-inch course blocks are blocks 4 inches high instead of the regular 8 inches. Two of these blocks are made with one filling of the mold box.

The 4-inch blocks are used for lattice and porch work, and for belt courses around a building to break up the monotony of one style or size of block. To make these blocks you require a special attachment which consists of a face plate for making two whole blocks, one face plate for making two half and four quarter blocks, one pair of core end gates, one return end gate to match the face plate, two dividing pallets and a set of four dividing plates for making half and quarter blocks. It is necessary to have one dividing plate for every two course blocks you intend to make in a day. One of the course blocks rests on the regular pallet in the machine and the other on the dividing pallet. Be sure to order enough additional pallets for a day's output. This attachment is complete for making the regular blocks and return corner blocks in whole, half and quarter sizes.

We can furnish 4-inch Course Block Attachments only in the following designs: Plain, rock, panel and tooled. Be sure to tell us whether your machine has one or two cores, what design you want, and order the correct size. Shipped from factory in CENTRAL OHIO.

No. 44M5726	Course Block Attachment for 8x8x16-inch Triumph Block Machine. Shipping weight, 46 pounds. Price.....	\$5.30
No. 44M5727	Course Block Pallet for 8x8x16-inch Triumph Block Machine. Shipping weight, 6 pounds. Price.....	19c
No. 44M5736	Course Block Attachment for 8x10x16-inch Triumph Block Machine. Shipping weight, 53 pounds. Price.....	\$5.75
No. 44M5737	Course Block Pallet for 8x10x16-inch Triumph Block Machine. Shipping weight, 8 pounds. Price.....	23c
No. 44M5746	Course Block Attachment for 8x12x16-inch Triumph Block Machine. Shipping weight, 60 pounds. Price.....	\$6.23
No. 44M5747	Course Block Pallet for 8x12x16-inch Triumph Block Machine. Shipping weight, 10 pounds. Price.....	25c

TO MAKE 4-INCH VENEER BLOCKS.



Veneer Block Attachment.

In many localities there is a demand for blocks 4 inches thick for veneering frame or brick buildings, or for building a two-piece wall with air space between, the

blocks being tied together with metal ties. To make these blocks you require a special attachment which consists of a special face plate mounted on a set of brackets which raises it up within 4 inches of the top of the mold box, a face plate for half and quarter blocks and a special end gate for corner blocks.

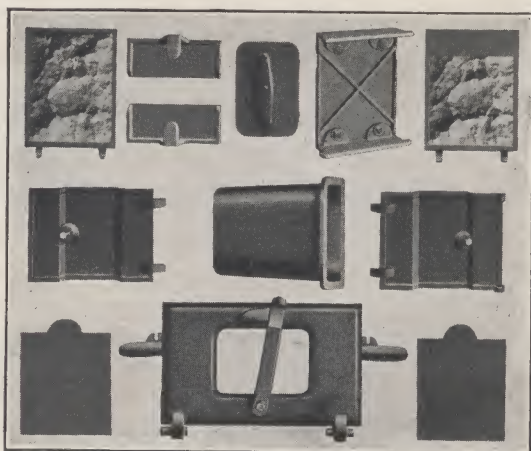
The plain or rock face plate and plain end gates must be used in the machine in connection with the veneer block attachment to make regular blocks, and a special end gate is provided for corner blocks. If your machine is not equipped with plain end gates, be sure to order them with the veneer block attachment.

Be sure to mention design and order the proper size. Shipped from factory in CENTRAL OHIO.

No. 44M5725	Veneer Block Attachment for 8x8x16-inch Triumph Block Machine. Shipping weight, 35 pounds. Price.....	\$3.90
No. 44M5735	Veneer Block Attachment for 8x10x16-inch Triumph Block Machine. Shipping weight, 40 pounds. Price.....	\$4.00
No. 44M5745	Veneer Block Attachment for 8x12x16-inch Triumph Block Machine. Shipping weight, 45 pounds. Price.....	\$4.20

TO CHANGE MACHINE SIZE.

Should you desire to make another size of block on your Triumph Block Machine you can do so at small additional cost for a flask attachment of the proper size. Where there is a big demand for more than one size of block it is always advisable to purchase an adjustable block machine such as the Knox adjustable block machines described on pages 19 and 20, or have a block machine for each size of block you want to make. In many cases, however, it would not be profitable to do this and in such cases this attachment will answer the purpose provided you already have a complete machine. The attachment consists of a back wall with core, sample wood pallet, two core end gates and two rock (or other design) end gates, two dividing plates, two joist block attachments and core plug. The 8x10x16-inch and 8x12x16-inch attachments include a special end gate and plate for making blocks with 8x8-inch return end for turning corners. This breaks joints exactly in the center without using some odd shaped or special size blocks. Please do not order the flask attachment unless you have a Triumph Block Machine, because the attachment is not a complete mold and cannot be used to make blocks. **State whether single or double core style is desired.**

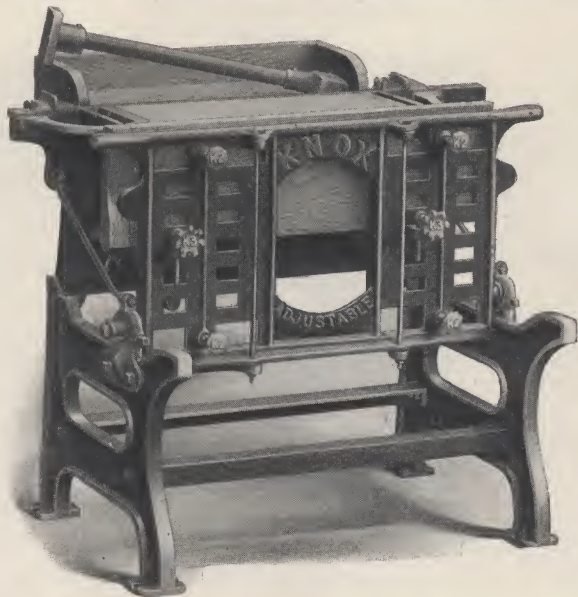


Triumph Flask Attachment.

- No. 44M5757** Flask Attachment for 8x8x16-inch Triumph Block Machine.
 Shipping weight, 110 pounds. Price.....\$5.45
No. 44M5758 Flask Attachment for 8x10x16-inch Triumph Block Machine.
 Shipping weight, 135 pounds. Price.....\$6.45
No. 44M5759 Flask Attachment for 8x12x16-inch Triumph Block Machine.
 Shipping weight, 165 pounds. Price.....\$7.15

TO CHANGE FLASK ATTACHMENT. Loosen set screws and remove the steel pins on which the back wall or core plate is hinged and remove the back wall. Replace it with the back wall of the desired size of flask attachment, replacing the steel pins and tightening the set screws holding them in position. Take latches off end gates and put them on end gates that match the back wall. Adjust end gates so they will be square with face plate by placing the iron washers on either side of latch, as may be required. The front wall is not changed, as the pallet takes care of the width of the front wall of the flask. This prepares the machine for another size and it is handled just as described on pages 14 and 15.

KNOX ADJUSTABLE BLOCK MACHINE.



This illustration shows the Knox Adjustable Block Machine adjusted to make blocks 8x8x20 inches in size, using a wood pallet.

ADJUSTMENT FOR LENGTH. The face plate controls the length of the block. The brackets are held securely in position by means of a wedge which is tightened and locked by hand wheel screws marked K3 in the illustration, which shows position of brackets set for 20-inch face plate. Moving the right hand bracket into the hole directly to the right sets the machine for 24-inch face plates. Moving this bracket back to position as shown and moving the left hand bracket into the hole directly to the right sets the machine for 16-inch face plates. Any length under 16-inch is provided by division lines on the face plate, which holds the lower end of a dividing plate, while the upper end is held by a special hopper and guide furnished with the machine.

ADJUSTMENT FOR WIDTH. As blocks are made face down in the Knox Adjustable Block Machine, the depth of the mold box controls the thickness of block. The illustration shows machine set for making blocks 8 inches thick. To make blocks 10 inches thick the face plate brackets are moved down one hole. Moving brackets to bottom holes adjusts machine to make blocks 12 inches thick. Moving the brackets up one hole from position illustrated makes blocks 6 inches thick and the top hole sets the machine for veneer blocks 4 inches thick. All these adjustments can be quickly and easily made.

The front wall is held by an adjustable bearing, so it can be kept in proper position, as explained below.

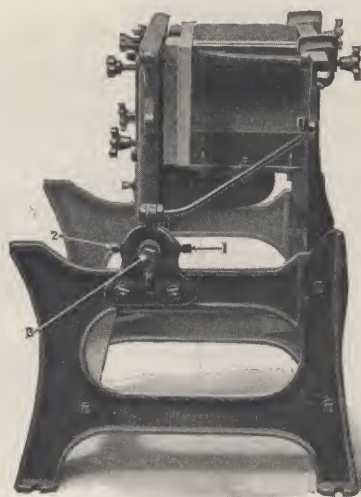
THE TOOL SHELF is attached by running long rod through holes in back wall and brackets of tool shelf.

Operate the empty machine a few times to become familiar with the method of handling it.

To open this machine simply pull the front wall forward by means of the handles on it. To close it lift the front wall back into an upright position. The brackets against which the end gates rest are adjustable to any position and are locked by means of the hand wheels on the back. Use the square sent with the machine and keep the end gate stops adjusted so block will be square.

CORES. We can furnish cores for practically any size of block, as listed on pages 22 and 23.

ADJUSTMENT AND METHOD OF OPERATING KNOX BLOCK MACHINE.



Set screws marked 1 and 2 in above illustration control the position of front wall pivot. Keep this pivot in a position where face plate is always snug up against back wall. The square shoulder marked 3 controls an eccentric bearing which governs up and down movement of front wall. A turn of this will enable you to keep top edge of front wall on same level as top edge of back wall. Loosen set screws 1 and 2 before trying to adjust with No. 3 and tighten again when proper adjustment is made.

TO MAKE A BLOCK. Close the machine and see that end gate brackets are adjusted so end gates are square with face plate and back wall. See that pallet fits snugly against face plate and end gates, adjusting, if necessary, by turning adjusting screw which is shown in illustration on page 19. Do not turn adjusting screw in far enough to force flask out of square. Put in a thin layer of facing material, mixed as directed on pages 6 and 7, and then fill flask about one-half full of backing material, mixed as directed on pages 9 and 10. Tamp a slight depression where the core comes and drop core into place. Then put in another shovelful of material and tamp it thoroughly around the core with small end of tamper. Fill the flask, tamp thoroughly and smooth off back of block. To release block from machine pull front wall forward. Pull core out with a straight upward pull, being careful not to get any side motion or you will break the block. Then open out end gates and remove them. Take hold of pallet and with a straight outward pull move block away from the face plate and carry away from machine to be cured, as explained on pages 35 to 37.

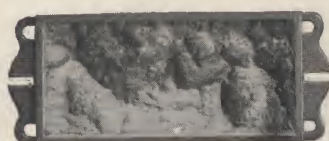
WET PROCESS PLAIN FACE BLOCKS.

You can make plain face blocks of very wet material in the Knox machine. A wet process block is cured more quickly and is stronger than a block made of semi-wet material.

To make a block from very wet material use the plain face plate and be sure it is perfectly clean. See that the lower edge of pallet does not drop below the face plate when flask is ready to fill. Fill the flask and tamp in the usual manner. Turn the block and remove the end gates and core in the usual way. Then lift block straight up, scraping edge of pallet against face plate. This trowels the face of the block to smooth finish.

SUPPLIES FOR KNOX BLOCK MACHINE

FACE PLATES.



Face Plate for whole blocks.



Face Plate for fractional blocks.

A few additional face plates in various designs should be on hand in every block plant. We can furnish three sizes of plates for the Knox machine and each size can be had for making whole blocks or fractional blocks in various lengths as listed. See designs on pages 12 and 13. All plates are shipped from factory in CENTRAL OHIO.

16-INCH FACE PLATES.

No. 44M5940 16-Inch Face Plate for whole blocks. Mention design wanted.
Shipping weight, 17 pounds. Price.....\$1.48

No. 44M5941 16-Inch Face Plate, divided to make fractional blocks as follows:

Division A—Divided to make two 4-inch blocks and one 8-inch block.

Division B—Divided to make two 8-inch blocks.

Division C—Divided to make one 4-inch block and one 12-inch block.

Division D—Divided to make one 2-inch block, one 6-inch block and one 8-inch block.

Division E—Divided to make full length block with half of face smooth, for use in inside corners.

Division F—With division line 12 inches from end, for outside angle bay window blocks.

Mention division and design wanted, otherwise we will send Division A, divided for one 8-inch block and two 4-inch blocks. Shipping weight, 17 pounds. Price.....\$1.50

No. 44M5942 16-Inch Circle Face Plate for curved face blocks for circular bay windows and silos. Furnished to conform with circles of 16, 20 or 24-foot diameter and in plain and rock designs. **Mention design and radius wanted.**
Shipping weight, 17 pounds.

Price\$1.55

20-INCH FACE PLATES.

No. 44M5944 20-Inch Face Plate for whole blocks. Mention design wanted.
Weight, 21 pounds. Price.....\$1.85

No. 44M5945 20-Inch Face Plate, divided to make fractional blocks as follows:

Division A—Divided to make two 5-inch blocks and one 10-inch block.

Division C—Divided to make one 5-inch and one 15-inch block.

Division E—Divided to make full length block with half of face smooth, for use in inside corners.

Division F—With division line 15 inches from end, for outside angle bay window blocks.

Mention division and design wanted, otherwise Division A for one 10-inch block and two 5-inch blocks will be furnished. Shipping weight, 21 pounds.

Price\$1.90

No. 44M5946 20-Inch Circle Face Plate for curved face blocks for circular bay windows and silos. Furnished to make blocks to conform with circles of 16, 20 or 24-foot diameter and in rock and plain designs. **Mention design and radius wanted.** Shipping weight, 21 pounds. Price.....\$1.95

. 24-INCH FACE PLATES.

No. 44M5947 24-Inch Face Plate for whole blocks. Mention design wanted.
Shipping weight, 26 pounds. Price.....\$2.25

No. 44M5948 24-Inch Face Plate, divided to make fractional blocks as follows:

Division A—Divided to make two 6-inch blocks and one 12-inch block.

Division B—Divided to make two 12-inch blocks.

Division C—Divided to make one 6-inch and one 18-inch block.

Division D—Divided to make one 8-inch and one 16-inch block.

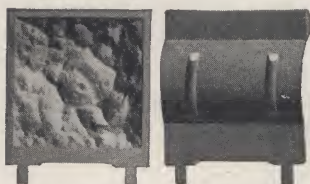
Division E—Divided to make full length block with half of face smooth, for use in inside corners.

Division F—With division line 18 inches from end, for outside angle bay window blocks.

Mention design and division wanted, otherwise Division A, for two 6-inch blocks and one 12-inch block will be furnished. Shipping weight, 26 pounds.

Price\$2.30

No. 44M5949 24-Inch Circle Face Plate for curved face blocks for circular bay windows and silos. Furnished to make blocks to conform with circles of 16, 20 or 24-foot diameter and in rock and plain designs. **Mention design and radius wanted.** Shipping weight, 26 pounds. Price.....\$2.35



Rock Design End Gate. Cored End Gate. 6 pounds. Price, each.....\$0.79

END GATES.

All end gates for the Knox Block Machine are interchangeable and can be furnished in any design for corner blocks, and in cored style for regular stretcher blocks. **Be sure to tell us what style or design and order the correct size.**

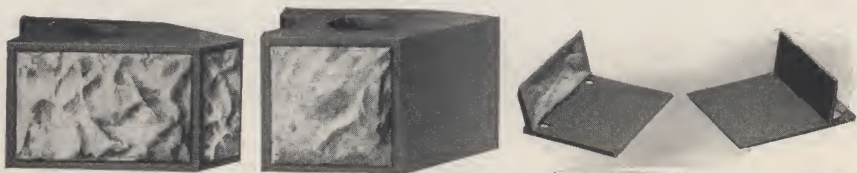
No. 44M5950 8x4-Inch End Gate for veneer blocks 4 inches thick. Shipping weight, 6 pounds. Price, each.....\$0.79

No. 44M5951 8x6-Inch End Gate for veneer blocks 6 inches thick. Shipping weight, 7 pounds. Price, each......85

No. 44M5952 8x8-Inch End Gate for blocks 8 inches thick. Shipping weight, 8 pounds. Price, each......98

No. 44M5953 8x10-Inch End Gate for blocks 10 inches thick. Shipping weight, 10 pounds. Price, each.....1.19

No. 44M5954 8x12-Inch End Gate for blocks 12 inches thick. Shipping weight, 12 pounds. Price, each.....1.29



Outside Angle Block.

Inside Angle Block.

Outside Angle Plate. Inside Angle Plate.

TO MAKE BAY WINDOW BLOCKS it is necessary to have a pair of bay window angle plates of the proper size, a face plate divided for one-half block for making inside angle blocks, and one plate with division line three-fourths the length of the plate for outside angle blocks. If you have no face plates properly divided, be sure to order from list on page 21. A pair of angle plates and the face plates referred to will enable you to make bay window blocks for inside and outside angles as illustrated. **Be sure to tell us what design is wanted and order the correct size.**

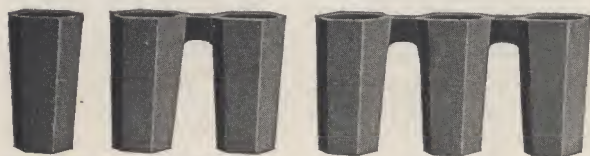
No. 44M6020 Bay Window Angle Plates for blocks 4 inches thick. Shipping weight, 14 pounds. Price.....\$1.60

No. 44M6021 Bay Window Angle Plates for blocks 6 inches thick. Shipping weight, 16 pounds. Price.....1.70

No. 44M6022 Bay Window Angle Plates for blocks 8 inches thick. Shipping weight, 18 pounds. Price.....1.75

No. 44M6023 Bay Window Angle Plates for blocks 10 inches thick. Shipping weight, 10 pounds. Price.....1.80

No. 44M6024 Bay Window Angle Plates for blocks 12 inches thick. Shipping weight, 20 pounds. Price.....1.85



Single Core.

Double Core.

Triple Core.

CORES.

To make the proper air space in the various sizes of blocks it is advisable to have a core for each size of block you make. You can use

a smaller core if desired, but you can save the price of the core in concrete saved by using a core designed for the size of block you want to make. All cores are made for blocks 8 inches high, the measurements given in the price list being the thickness or width and the length of block. **Be sure to select correct size and mention correct catalog number.**

No. 44M5960	Single Core for 8x8-inch blocks.	Shipping weight, 10 pounds.	Price.....	\$1.30
No. 44M5961	Single Core for 8x10 or 8x12-inch blocks.	Shipping weight, 12 pounds.	Price.....	1.60
No. 44M5963	Single Core for 10x10 or 10x12-inch blocks.	Shipping weight, 15 pounds.	Price.....	1.80
No. 44M5964	Single Core for 12x12-inch blocks.	Shipping weight, 18 pounds.	Price.....	1.90
No. 44M5965	Double Core for 8x15, 8x16 or 8x18-inch blocks.	Shipping weight, 20 pounds.	Price.....	2.35
No. 44M5966	Double Core for 10x15, 10x16 or 10x18-inch blocks.	Shipping weight, 30 pounds.	Price.....	2.60
No. 44M5967	Double Core for 12x15, 12x16 or 12x18-inch blocks.	Shipping weight, 35 pounds.	Price.....	3.25
No. 44M5968	Double Core for 8x20-inch blocks.	Shipping weight, 25 pounds.	Price.....	2.75
No. 44M5969	Double Core for 10x20-inch blocks.	Shipping weight, 30 pounds.	Price.....	4.00
No. 44M5970	Double Core for 12x20-inch blocks.	Shipping weight, 35 pounds.	Price.....	4.75
No. 44M5971	Triple Core for 8x24-inch blocks.	Shipping weight, 30 pounds.	Price.....	3.90
No. 44M5972	Triple Core for 10x24-inch blocks.	Shipping weight, 35 pounds.	Price.....	4.75
No. 44M5973	Triple Core for 12x24-inch blocks.	Shipping weight, 45 pounds.	Price.....	5.00



8x16-Inch Iron Pallet.

IRON PALLETS.

The Knox Block Machine uses wood pallets, but as many prefer to use iron pallets we are prepared to furnish them in many sizes at prices shown below.

Be sure to give correct number and order the proper size.

No. 44M6000	4x16-Inch Iron Pallet.	Shpg. wt., 5 lbs.	Price.....	21c
No. 44M6001	6x16-Inch Iron Pallet.	Shpg. wt., 6 lbs.	Price.....	25c
No. 44M6002	8x16-Inch Iron Pallet.	Shpg. wt., 7 lbs.	Price.....	26c
No. 44M6003	10x16-Inch Iron Pallet.	Shpg. wt., 11 lbs.	Price.....	30c
No. 44M6004	12x16-Inch Iron Pallet.	Shpg. wt., 16 lbs.	Price.....	37c
No. 44M6005	4x20-Inch Iron Pallet.	Shpg. wt., 8 lbs.	Price.....	28c
No. 44M6006	6x20-Inch Iron Pallet.	Shpg. wt., 9 lbs.	Price.....	33c
No. 44M6007	8x20-Inch Iron Pallet.	Shpg. wt., 10 lbs.	Price.....	36c
No. 44M6008	10x20-Inch Iron Pallet.	Shpg. wt., 12 lbs.	Price.....	42c
No. 44M6009	12x20-Inch Iron Pallet.	Shpg. wt., 16 lbs.	Price.....	45c
No. 44M6010	4x24-Inch Iron Pallet.	Shpg. wt., 8 lbs.	Price.....	32c
No. 44M6011	6x24-Inch Iron Pallet.	Shpg. wt., 15 lbs.	Price.....	47c
No. 44M6012	8x24-Inch Iron Pallet.	Shpg. wt., 20 lbs.	Price.....	60c
No. 44M6013	10x24-Inch Iron Pallet.	Shpg. wt., 25 lbs.	Price.....	70c
No. 44M6014	12x24-Inch Iron Pallet.	Shpg. wt., 30 lbs.	Price.....	85c

MORE ABOUT BLOCK MAKING.

If two men are working at the Knox or Triumph machine it is well to commence to tamp as soon as the first shovelful of backing material is thrown in the flask, and continue to tamp until the flask is full.

If only one man works at the Knox or Triumph machine tamp the material up to the core openings, but do not smooth it out. Insert the cores and finish filling the flask, after which tamp thoroughly.

Don't tamp any of the material in the Wizard Concrete Building Block Machine until your cores are in and you have completely filled the mold box. The Wizard is unlike all other machines. The specially shaped cores enable

you to obtain an even and solid consistency throughout by tamping the material after the cores have been entered and the flask has been filled up, and you are not liable to break the block when releasing it unless you permit the flask to drop while turning it over and thus jolt the machine.

BLOCKS FOR BUILDING TO BE STUCCO FINISHED. Stucco plastering on concrete block buildings is fast coming into general use. There are so many possibilities in this method and so many pleasing results can be had that we believe all of our block machine users can go into this work to good advantage to themselves. See pages 39 to 42. For making blocks to be used in a building which is to be stucco plastered it is unnecessary to face them. Use the plain face plate in the machine, so that one face of the block will be smooth; tamp it thoroughly in the usual manner and when the back of the block is struck off smooth, instead of leaving it smooth take the end of the striker or a big spike and scratch the surface, forming a number of irregular scratches in it. When laying up the blocks the back or scratched surface should face outward, while the smooth surface should form the inside wall. The scratched surface of the blocks forms an ideal bond for the stucco plaster, and if it is properly worked into the scratches in the blocks it will hold better than on wood lath and be more durable than stucco on metal lath. The inside of the wall being smooth makes it easy to put a thin plaster finish where desired to avoid expense of interior plastering.

SIZE OF BLOCKS TO USE. The size of blocks to use in a building depends on the size of the building and the requirements of the building ordinances.

For all ordinary purposes we would recommend the 8x12x16-inch block for foundation, 8x10x16-inch size for first floor and 8x8x16-inch size for the second floor of a two-story and basement dwelling house. For stores, factories or warehouses where the floors will be loaded more heavily the foundation should be wider, from 16 to 20 inches, depending on the height of the building and the floor loads.

It has already been demonstrated that concrete blocks properly made and cured will support a greater load than brick, and, therefore, a building can safely be constructed of concrete blocks with walls a little thinner than would be necessary for a brick building of the same kind. We know of one instance where a three-story apartment building was built entirely of 8x8x16-inch blocks, but we do not advise this practice. For an ordinary dwelling, one and one-half or two stories high, 8x8x16-inch blocks can safely be used on a 10-inch or 12-inch foundation, but the building ordinances in some towns will not permit the use of this size. If there is a building ordinance in your town acquaint yourself with its requirements before building. See page 45 for more information on the strength of blocks.

Don't forget that you must cure your blocks or product properly by adding plenty of water, or a great deal of the strength will be lost.

CONCRETE BRICK.

Concrete brick compare favorably in strength and appearance with high priced pressed brick. For this reason they are especially adapted for ornamental porch work and brick fireplaces.

HANDY TWO-WAY BRICK MACHINE. This machine will make brick either face down or face up, as desired. The capacity when made face up is about twice that of face down method.

To make brick face down. The machine is shipped prepared for making brick face down. To familiarize yourself with the machine, operate it empty a few times. The lever on the right hand side of the machine moves the dividing plates back and forth. Bring the lever forward and see that dividing plates are locked in grooves in front wall. If a face brick is desired sift the facing material in the machine, being sure to cover the smooth metal face plate, or ornamental plates if used. Then put in backing material and tamp. To release brick place the wood pallet over the top of the brick and swing the pallet arms over the back of the pallet to the cleats. Lift up side lever to withdraw division plates. Then take hold of pallet arms and bring them with mold box over and down in front of the machine. This operation turns the brick over on the pallet and it can be removed with the brick on it and set away for curing. Raise the mold box and lock as before.

To make brick face up. Remove the smooth face plate and pallet arms, attach locking clamps to back wall, place wooden pallet on bed of machine in place of iron plate, bring dividing plates forward and clamp front wall up with side clamps. After mold box is filled and tamped and bricks are smoothed off, unlatch front plate, withdraw dividing plates by means of side lever and brick can be removed on the wood pallet.

TRIUMPH SIX-BRICK MACHINE. To operate, a pallet is placed on the bed of the machine; the front wall is raised in position and held securely by the two latches. The side lever is then brought forward, which enters the division plates. See that they are properly entered in the grooves in the front wall. The mold is filled in the usual way and brick thoroughly tamped. To release, open the side latches and lower the front wall. Raise the side lever to withdraw the division plates, leaving the brick on the pallet to be carried away for curing. In making ornamental brick on this machine the brick must remain on the plates until hard enough to move, which will require from twelve to twenty-four hours.

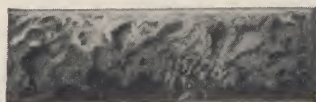
The material to use in making concrete brick depends entirely upon the place the brick will take in the wall. Brick for the face of the wall or for finishing purposes only should be made of a better material and with a finer face than brick that go in the back of the wall.

COMMON BRICK, for filling in purposes or for back walls where a finished face is not required, can be made from a mixture of one part of cement to five parts of clean sharp sand, or if you can get No. 5 gravel or crushed stone, as described on page 4, use one part cement, two parts sand and three or four parts gravel or crushed stone. Mix all the materials thoroughly, as explained on pages 9 and 10, and be careful not to get them too wet. Fill each brick mold of the machine with the concrete mixture. It is best to tamp the brick with the wedge end of the tamper at first in order to fill all the corners, then finish off with the back end and strike off all superfluous material with a trowel or scraper so that the brick will be perfectly square and true with the dividing plates.

FINISHING BRICK should be made from a mixture consisting of one part cement and four parts of clean, sharp, coarse sand. If a better grade of brick is desired it is advisable to face the brick with a mixture of one part of cement and two parts of clean sharp sand and make the backing of one part cement and four parts sand. No. 5 gravel or crushed stone screenings of the same size can be used in the backing of brick and will add greatly to their strength and at the same time reduce the cost. Use this material in proportion of one part cement, two parts sand and four parts gravel or stone.

COLORED BRICK. The use of concrete colors mixed with cement, as directed on pages 7 and 8, and this in turn mixed with one or two parts of sand will make brick with colored face equal in appearance and durability to the highest priced pressed brick. They can be made at a comparatively small cost and it will pay you to consider the manufacture of colored faced brick along with your other products.

ORNAMENTAL BRICK.



Rock Design. No. 1.



Panel Design. No. 6.



Oval Face. No. 20.



Pyramid Design. No. 21.



Rope Design. No. 15.



Block Scroll. No. 22.

We can furnish ornamental face plates for our Handy Two-Way Brick Machine in any of the handsome designs here shown. You need one face plate for each brick. Place an ornamental face plate in the bottom of the mold and make

the brick the same as outlined for making brick with a facing. On the Handy

Two-Way Brick Machine the ornamental face plates are removed immediately after turning the brick and can be used again at once. On the Triumph Machine they cannot be removed until the brick are hard enough to be lifted from the pallet.

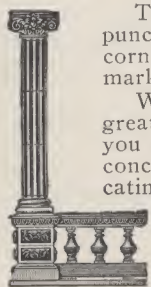
Brick for return corners with ornamental face require a special matched face plate and end plate.

No. 44M5891 Ornamental Face Plate for Handy Two-Way Brick Machine.
Shipping weight, each, 2 pounds. Price, per plate.....**38c**

No. 44M5893 Ornamental Plates for Making Return End Corner Brick.
Shipping weight, per pair, 3 pounds. Price, per pair.....**69c**

SPECKLED FACE BRICK. Speckled face brick can be made in any desired color or combination of colors. First make up a rich cement mortar of the desired color, as described on pages 7 and 8. Moisten and spread out evenly in a layer about $\frac{1}{8}$ or $\frac{1}{4}$ inch thick on trays or any flat surface and keep it damp for two or three days at least, so it will become properly crystallized. Then remove and break up into small pieces the size of the specks desired in the face of your brick. Scatter as many of these specks as are wanted to show on the face of the brick on the face plate in the machine, then sift in the facing material as before explained and finish your brick in the usual way. The colored specks will be pressed into the face of the brick and such parts as are in contact with the face plate will remain visible when the brick is made. As a rule, speckled brick are made with a facing of brown or yellow, the specks being black, gray, green or red. For black specks gravel or cinders can be used, but as the cinders absorb water it is advisable to use our black mineral color with the cement. Brick should be allowed to rest on a pallet for at least twenty-four hours or until they become hard enough to handle, then pile for curing, as explained on pages 35 to 37.

PORCH MATERIALS.



The corners of the plates forming these molds are marked with punch marks on the upper edge where fastened together. The two corners marked with one mark each go together, the two corners marked with two marks go together, and so on.

When making porch products in which the finished work has a great many fine lines or deep cuttings it is absolutely necessary that you keep your molds perfectly clean and well oiled. To prevent the concrete from sticking to the molds oil them with linseed, black lubricating or heavy cylinder oil, or, better still, make up a solution of turpentine and paraffin (about 1 ounce of paraffin dissolved in a pint of turpentine) and apply a coat of this to the molds and allow the turpentine to evaporate. This leaves a thin coating of paraffin on the mold and effectually prevents concrete from sticking. Be careful that the molds are not oiled too much, because this is almost as bad as if no oil was used. A thin film is all that is needed. For making column caps, bases, etc., set the mold on a solid level floor or a pallet. A pallet is not absolutely necessary, as these products can be made on any solid smooth floor. Be sure to lock the mold up true and square and make your facing as dry as is possible, having just enough moisture in it so it will hold together. Use the facing just as directed on pages 6 to 8. Pad this on the face of the mold and then fill in with backing material and tamp thoroughly. As there is no core used the backing material can be made a little wetter than ordinarily, which will insure a better product. To save material it is sometimes advisable to use a core, particularly when the product does not have a load to support. For column caps you can easily make a core, using a block of wood or even a piece of stovepipe. Before removing the bolts or clamps tap the mold lightly and carefully on all sides. This has a tendency to loosen the concrete. Take out the bolts or open the latches holding the mold together and remove each part carefully from the stone, pulling it straight out so that you do not shear off any of the design. Allow the stone to set where made until hard enough to move, which will take about twenty-four hours, and then cure as described on pages 35 to 37. Our porch molds are very simple, the various parts being held together by small bolts or latches, which we believe are readily understood by anyone. Always have the large end of mold down on pallet. Write us if you wish any special information.

FLUTED COLUMNS. When making fluted columns in our combination plain and fluted column mold use the solid fluted column pallet in the bottom of the mold and the skeleton fluted ring in the top of the mold; then insert the fluting bars in each section of the ring and pallet, being sure to get them straight, pad the facing in the usual manner, fill in the balance and tamp thoroughly. Remove the skeleton ring at the top and open the mold, releasing it from the stone. Pick the fluting bars off the stone, leaving it on the pallet till hard enough to move. If you wish to use the fluting pallet at once, remove the top ring and then carefully turn the mold with column in it over on the other end. To make the stop off for the top and bottom of the column insert the collar with elevated stop off buttons into the circular part of the column base mold or the ornamental cap mold.

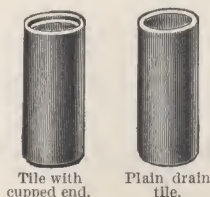
When making ornamental concrete balls or similar articles where there is a comparatively thin portion, it is advisable to reinforce the product at the weak part by inserting a couple of short pieces of barbed wire, iron rod, a big spike or something similar to provide the necessary binding strength.

FINISHING A PORCH MADE WITH CONCRETE PRODUCTS.

For best results as to appearance and durability we recommend that porch products be laid up as follows: Set the products with a mortar made of one part cement and one part fine sand. Be sure to fill all crevices with the mortar and smooth off any projections, getting the surface as even as possible. When the mortar sets thoroughly go over the entire job with a piece of sandstone or carborundum, rubbing down all joints until they are flush with the balance of the work; then wet the job thoroughly. Make a solution of cement and water of the consistency of ordinary kalsomine and go over the job with this solution, applying it evenly with a brush. It will be necessary to continually stir the mixture while applying to prevent the cement from settling to the bottom. This will fill all the pores and give the column a uniform color. If the first coat is not sufficient go over the job again with a piece of sandstone to smooth it down, dampen it, and apply another coat of cement and water. This will add greatly to the appearance of the job.

A concrete house is not complete without having a porch built of concrete products. If you have no porch molds in your line get our latest Concrete Machinery Catalog, which we send free on request, and order a few molds for making porch products. We furnish them at very reasonable prices and have many beautiful designs. The profits on this kind of work are much greater than on blocks or brick and the field is larger.

CONCRETE TILE.



Concrete tile are coming into popularity more rapidly each year. It has been proven beyond all doubt that they are far superior to clay tile in every respect and in most localities are much cheaper. The up to date concrete block yard is not complete without equipment for making concrete tile, and if you have no tile machine you are losing money by not being in a position to furnish this new product.

WIZARD TILE MACHINE.

Tile can be made from mixtures of cement and sand, using one part cement to from three to five parts of sand, depending on what the tile will be used for. From two to four parts of small stone or gravel which will pass through a $\frac{1}{4}$ -inch screen, can be used to good advantage. Drain tile requires less cement than tile to be used for sewerage or irrigation work.

To start with, it is best to use a fairly rich mixture until you become accustomed to working the machine. Tile are easily broken and care must be taken in making them. The material must be "medium dry" mix, with just enough moisture so material will retain its shape when pressed in the hand. Be careful not to get it too wet.

Prepare the machine for operating by throwing the side lever clear back. Place the jacket in position, being sure that it is clear down to the bottom.

Bring the shelf over flush with the top of the jacket and the retaining hopper clear over in line with the jacket. Now place the tamper hopper through the top of the retaining hopper and into the jacket.

To start the first tile throw in about one-half measure of material, tamp it in, then put in a full measure of material for each tile. Now tamp thoroughly, turning the tamper back and forth to distribute the material evenly and feed it as the tile is completed. The retaining hopper on top of jacket keeps the tamping hopper in line until the top of the tile is thoroughly tamped. When the tile is completed and your tamping hopper is clear above the top of the tile, the retaining hopper can be pushed over on the shelf, carrying with it the surplus material and the tamping hopper. This scrapes off the top edge of the tile perfectly true. The tamping hopper can always be left in the retaining hopper. Place the center pin of the ring trowel in the hole in top of the core and twist to the right and left, which will finish the end of the tile. Bring the side lever over toward you until the tile is free from the core. (You can assist this operation by using your foot upon the treadle.) Carry the tile in the jacket to some level place, a cement floor preferably, or a smooth floor or plank will do. Before opening the jacket, tap it just a little with a small hammer, which will make it release readily from the tile. Be sure to release both latches on the jacket at the same time. If you release first one and then the other, you will most likely break the tile. You may possibly break the first two or three tile, but you will have no trouble thereafter, for we have seen the machine operated for several hours continuously making perfect tile without a single broken one, and you can easily secure this result after you familiarize yourself with the machine. You will make twice as many the second day as the first, and you will soon become proficient. If the tile does not stand up when released from the jacket, it is because your mixture is not of the proper proportion or consistency, and a little experimenting along this line is necessary, or it is because the bottom of the tile has not been tamped enough. For the body mixture it is not advisable to use gravel or pebbles that will not pass through a $\frac{3}{4}$ -inch mesh. Be sure to follow directions about curing, as given on pages 35 to 37.

TO MAKE TILE WITH CUP AND GROOVE END.



You will need the special cupping attachment and some extra bottom rings as listed below. A bottom ring is slipped over the core and allowed to rest on the bottom plate of the machine. The tile is then made as directed above and is finished off with a special top ring instead of the plain top ring furnished with the machine. It is a simple matter to lay these tile up with water tight joint by placing a small quantity of rich cement mortar mixed in the proportion of one part of cement to two parts of sand in the cupped end. The mortar should be mixed very fine.

As the bottom ring must stay under the tile until hard enough to remove, be sure to order one extra bottom ring for each tile you want to make in a day. Also be sure to order the correct size. Shipped from foundry in CENTRAL OHIO.

CUPPING ATTACHMENT PRICE LIST.

TOP RINGS.

No. 44M6034	Top Ring for 4-inch Wizard Tile Machine. Shipping wt., 2 pounds. Price, each.....	30c
No. 44M6035	Top Ring for 5-inch Wizard Tile Machine. Shipping wt., 2½ pounds. Price, each.....	38c
No. 44M6036	Top Ring for 6-inch Wizard Tile Machine. Shipping wt., 3 pounds. Price, each.....	40c

BOTTOM RINGS.

No. 44M6044	Bottom Ring for 4-inch Wizard Tile Machine. Shipping weight, 1 pound. Price, each.....	8c
No. 44M6045	Bottom Ring for 5-inch Wizard Tile Machine. Shipping weight, 1½ pounds. Price, each.....	10c
No. 44M6046	Bottom Ring for 6-inch Wizard Tile Machine. Shipping weight, 1½ pounds. Price, each.....	12c

TO CHANGE THE SIZE OF THE WIZARD TILE MACHINE.



Should you desire to make more than one size of tile on this machine you can do so by simply purchasing a set of attachments as illustrated. Each set of attachments consists of a core, core base, mold supports, tamping hopper, retaining hopper, two jackets and a set of galvanized cups. These attachments are for use only with our Wizard Tile Machine. You cannot make tile

in the attachment alone. Shipped from factory in CENTRAL OHIO.

PRICE LIST.

No. 44M5871 Set of Attachments for 4-inch concrete drain tile, fits 5 or 6-inch Wizard Tile Machine. Shipping weight, 50 pounds. Price... **\$11.95**

No. 44M5873 Set of Attachments for 5-inch concrete drain tile, fits 4 or 6-inch Wizard Tile Machine. Shipping weight, 75 pounds. Price.... **15.70**

No. 44M5875 Set of Attachments for 6-inch concrete drain tile, fits 4 or 5-inch Wizard Tile Machine. Shipping weight, 100 pounds. Price.... **18.40**

TRIUMPH TILE MOLDS.

It is a very simple matter to operate our Triumph Tile Molds. As tile are more easily broken while green than concrete blocks, a little more care must be taken in operating the molds. Go slowly at first until you learn how to handle the molds, and speed will come of itself as you become familiar with the operation of the molds and the handling of the materials.

Tile can be made on a pallet or on a smooth floor as desired.

CAST IRON JACKET. To lock the mold, bring the halves of the mold together and close the latches on them.

GALVANIZED JACKET. This style of mold is easily operated and easily understood. To open, raise the latch holding clamping lever against the jacket, then bring the round clamping lever forward and the natural spring of the metal will expand the jacket and release it from the tile equally all around. To close the jacket, push the clamping lever around close to body of jacket and lock in position by turning the latch down over it.

TO OPERATE MOLD. Insert the core and turn the lever over until core is fully expanded. Then lock it in position by means of lock attached to core. To center the core, make three strips of wood about $\frac{1}{2}$ inch wide, the thickness of the tile wall and a little longer than the mold. Place these strips at equal distances apart between the core and jacket. They are to hold the core in center until the mold is partly filled. Put the core cover on the core and the hopper on the jacket.

NOTE—The 4-inch mold has a solid or non-collapsible core, therefore no core cover is required, and directions pertaining to collapsing core need not be followed.

MIXTURE. Use clean sharp sand mixed in the proportion of from three to six parts to one of cement. Drain tile can be made of a 1 to 6 mixture, while tile for sewerage purposes, culverts, etc., should be made of a richer material, about one part cement to three or three and one-half parts sand.

On 4 and 6-inch tile you can use a mixture of one part cement, two parts sand and two and one-half parts fine crushed stone or pebbles which will pass through a $\frac{1}{4}$ -inch square mesh screen. On the 10, 12 and 14-inch tile the size of stone or pebbles may be such as will pass through a $\frac{1}{2}$ -inch square mesh screen.

Mix the sand and cement thoroughly in the dry state, then add a small quantity of water and mix thoroughly. Add just enough water so the material will hold together when squeezed in the hand. Be careful not to get it too wet or you will have trouble in releasing the tile.

Put the material in the mold to a depth of 4 inches and tamp thoroughly. As the bottom of the tile has to support the entire tile it is very important that the bottom be thoroughly tamped to prevent the falling down of green tile before the cement sets hard enough to move the tile.

Put another layer of material in the mold and tamp this. As soon as sufficient material has been tamped in the mold to hold the core in place, pull out the wood guide strips and carefully fill and tamp the openings left by them. Continue to fill the mold in layers, tamping thoroughly till mold is full; then remove hopper and with a small trowel smooth the upper end even with top of mold.

When making tile with bevel and tongue ends, a pallet forming the inside of the bevel must be used, as illustrated in Concrete Machinery Catalog. The top of tile forming tongue is shaped by a special ring furnished with the attachment, as illustrated in our Concrete Machinery Catalog.

TO RELEASE CORE. Before trying to release the core take a light hammer or stick of wood and tap lightly all around on the jacket. This tapping loosens the concrete from the mold, making it easier to remove it from the tile. Take off core cover. Turn the core lever till core is fully collapsed and lock by means of latch provided. Pull the core straight up and do not let go of the collapsing lever until the core is out of the tile; then carefully release the latch and open jacket, at the same time pushing it back so the hinged side of mold will not come in contact with the tile and break it. Take your time until you become familiar with the handling of these molds and you will soon be able to make perfect tile rapidly. Don't be discouraged if you break one or two at the start, but be patient. A little practice will enable you to make a perfect tile every time. Leave the tile standing where it was made until the initial set of the cement takes place, or from twelve to twenty-four hours.

CURING. Tile being thinner than any other concrete product, they will dry much quicker. Therefore care must be taken to protect the tile from drying winds or the hot sun. As soon as they become hard enough so the cement will not wash they should be sprinkled thoroughly and kept moist for several days. Cure thoroughly, as explained more fully on pages 35 to 37. Tile should not be used until they have been cured for at least twenty days. In transporting pack them in hay or straw to prevent breaking or chipping.

TO MAKE "T" OR "Y" JOINTS.

To make a T or Y joint is a simple matter although it requires a little care. Select a good sound tile about two or three days old, of the size of the main line and which we will call the main tile. Also select a sound tile of the same age and of whatever size you want the branch outlet to be and which we will call the branch tile. With a cold chisel and light hammer carefully chip the end of the branch tile so it will fit up snug against the main tile at whatever angle you want the branch to run in. Then mark on the main tile all around the outside of the branch tile, which will give you the proper shape and size of opening to cut for your outlet. Now with a cold chisel and light hammer carefully cut out the marked section of the main tile, but about $\frac{1}{2}$ inch inside the marked line. Do not try to cut clear through the tile in one spot, but cut gradually all around the tile until you can remove the piece to be taken out.

Then carefully chip out to the marked line. When the opening has been completed, fit the branch tile to it. Wet the portions of each tile where they come in contact with one another, and then apply a thin coat of pure cement and water and put the two pieces together. Brace them from the inside and plaster the joint around the outside with a mortar made of one part cement to two parts sand. Allow to harden for twenty-four hours and then remove braces and plaster the joint on inside, finishing it smoothly.

LAYING TILE. For drainage purposes it is unnecessary to lay tile with tight joints. The ends are perfect in shape and the tile will lay close enough together for all drainage purposes. If a watertight joint is required it can be had by applying a rich cement mortar all around the joints or by the use of tile with tongue and bevel end. Be sure to dig the ditch for laying tile deep enough to bring the tile at least 2 feet below the surface, so they will not be plowed up.

TONGUE AND BEVEL END TILE.

This style of tile is easy to make and if our directions are carefully followed all the tile will be uniform in size so that the joints will fit together perfectly, and the tile, having no projection like the bell end tile, are much easier to lay. The bevel and tongue attachment consists of a bottom ring which forms the tongue and a top ring that is used as a trowel for forming the bevel or groove. The bottom ring is placed inside of the outer jacket of the tile mold, and this serves to center and hold the core in position. The tile is made in the usual manner and when completed the top ring is placed in position and rotated back and forth several times until embedded flush with the top of the outside jacket. It is then removed and the jacket and core removed the same as when making straight end tile. The tile must remain on the bottom ring or pallet until hard enough to remove, which will be in about twenty-four hours. When laying this tile a little cement and water solution placed in the groove is all that is necessary to form a watertight joint.

CONCRETE FENCE POSTS.



Lumber is increasing in value each year and good fence posts are becoming scarcer and higher priced. Concrete forms an ideal material as a substitute for the regular wood fence posts, and we are sure if you have no fence post mold in your equipment it will pay you to put several in and be prepared to furnish concrete fence posts, which will be in big demand. They can be sold at a reasonable price with a large margin of profit. See our Concrete Machinery Catalog, which we send free for the asking, for prices of post molds. The method of making is similar to that already outlined for manufacturing concrete blocks, etc., with the exception that the post must be reinforced. Not having a very large body and being subjected to side strain, reinforcement must be used to give it sufficient strength.

REINFORCEMENT FOR CONCRETE FENCE POSTS.

Reinforcement may consist of Nos. 6 to 8-gauge wire cut to length and straightened, 3-16-inch iron rods or any standard fence post reinforcement. Two strands of No. 10 or No. 12 wire twisted together make a very good reinforcement, as the irregularity in surface made by the twists forms an ideal bonding surface for the concrete, doing away with nearly all tendency to slip when strained. A hook should be bent in each end of reinforcement which will to a certain extent prevent slipping.

Crimped wire is not so good because when strained it is liable to straighten, which would probably break pieces out of the post.

The material used for reinforcement should be strong, light and rough enough to permit the mixture to get a firm grip upon it. It should be very rigid, with little or no tendency to spring or stretch. Nothing is gained by

using painted or galvanized reinforcement, because then the concrete merely adheres to the paint or galvanized coat and not to the material itself.

For the convenience of those who require reinforcement we can furnish it in 100-pound bundles, which we ship direct from our concrete machinery factory in CENTRAL OHIO. You will probably be able to buy this reinforcement cheaper at home, as almost any straight iron will do, whether old or new. However, we handle the reinforcement for the accommodation of those who are unable to procure it elsewhere, and we believe our prices are as low as anyone can quote on new material suitable for this purpose.

No. 44M5897 Fence Post Reinforcement. Cut in 7-foot lengths and straightened, about 90 pieces to 100 pounds.

Price, per 100 pounds.....\$ 2.19

Price, in lots of 1,000 pounds or more, per 1,000 pounds..... 21.00

TRIUMPH SINGLE FENCE POST MOLD.

The pallet may consist of any board or plank or level floor convenient to use, just so it is large enough to hold the mold. We recommend the use of a level floor or plank, because it is not well to move the posts until four or five days after they are made, owing to their extreme length and small dimensions. Sprinkle the pallet or floor (if of wood) thoroughly to prevent absorption of moisture from posts. Place the mold on the pallet and be sure that the end pieces or stop offs are in place and the latches securely tightened.

The mixture should consist of one part good Portland cement, two parts coarse, clean sharp sand and four parts clean gravel. Mix thoroughly while dry; then moisten and mix again. Mixture should be as wet as can be used without sticking to the forms.

TO MAKE POSTS.

Fill the mold one-third full of concrete and tamp thoroughly; then take the seating block sent with the mold, and with the longest side extending down into the mold, run down one side of the mold, which will make a groove in the concrete, into which drop a reinforcement bar or wire. Now run the seating block down the other side and drop in another reinforcement bar or wire. Fill the mold about level full and tamp again, then use the short side of seating block and run down the mold the same as previous time and place in the reinforcement bars or wire. The object of the seating blocks is to place the reinforcement at a uniform distance from the corners to give the proper strength and equal bearing strain from all sides and to provide covering sufficient to protect reinforcement from rust. This is about $\frac{3}{4}$ inch from the surface. Now fill the mold completely full and tamp solidly, and then use a shovel or straight board to scrape off the excess concrete and trowel smooth. Loosen the thumbnut at large end of mold, open it out and push back to remove mold.

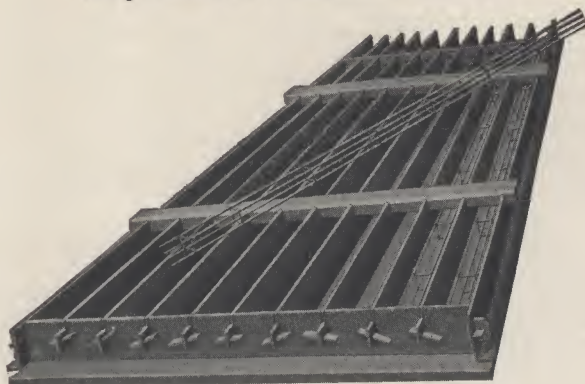
CORNER POSTS.

THE TRIUMPH CORNER POST MOLD. This makes a large and heavy post suitable for corners and gate posts. The lower end is adjustable in size so you can make the post large or small as desired, depending on the load to be placed on it. The mold is assembled and opened the same as our line post mold, and is handled practically the same when making the post. No grooving block is needed and the amount of reinforcement used should be governed by the size of reinforcement. Four pieces of $\frac{1}{4}$ -inch rod placed $\frac{3}{4}$ inch from the surface and about $1\frac{1}{2}$ inches apart on each side will be about right. When setting the corner post dig the hole considerably larger than the post, set in the post and fill hole with concrete mixed very wet.

TRIUMPH DOUBLE POST MOLD.

This is handled exactly like the single mold as described on page 32, but before opening out the side plates and after removing the thumb bolts, remove the center division board. This is tapered and can be taken out very easily. The side pieces are then removed just as described on page 32.

ADJUSTABLE GANG MOLDS.



These molds can be used on any flat floor and are easily assembled by placing the widest end plate in position and locking to the widest end of the flanged side rails by means of the keys furnished. The narrow end of the side rails and division plates have several slots spaced 6 inches apart. This provides the adjustment for the length of the post, and one end plate should be placed in proper slot to make mold the desired length. The division plates are next placed in position, being careful to connect the wide end of each division plate with the wide end plate. The two crosspieces of angle steel are placed across the mold with the dividing plates entering the slots as illustrated.

REINFORCEMENT may be any standard fence post reinforcement, which may be laid in the mold near each corner as the concrete is placed, or it may be stirrups together as illustrated above, which insures proper placing. Two pieces of No. 10 wire twisted together, cut to length and straightened, placed in each corner, make a very good reinforcement, and we can furnish wire with these molds at prices shown at top of following page. The solid reinforcement quoted on page 32 can also be used.

METHOD OF USING.

The concrete mixture should be made of a mixture of one part cement, two parts clean sharp sand and three to four parts of clean gravel or crushed stone not larger than $\frac{1}{2}$ inch. This should be mixed thoroughly and enough water added so it can be puddled in place with a stick or spade without tamping.

After the molds have been filled the edges of the posts are rounded with a sidewalk tool or trowel, or they can be left square, just as desired.

The concrete is allowed to set for about two hours, then the keys holding the form together are removed and the dividing plates forming the mold sections are withdrawn, leaving the posts where made until hard enough to handle.

QUANTITIES OF MATERIAL REQUIRED TO MAKE POSTS

	For 100 6-Foot Posts	For 100 7-Foot Posts	For 100 8-Foot Posts
Cement.....	3¾ barrels	4½ barrels	5 barrels
Sand.....	1 cubic yard	1¼ cubic yards	1½ cubic yards
Gravel.....	2 cubic yards	2½ cubic yards	3 cubic yards

No. 44M6106 Reinforcement for 6-Foot Posts. Made up of two pieces $\frac{1}{8}$ -inch wire twisted together, cut to length and straightened. Put up in bundles of 100 pounds, sufficient for fifty-one posts.

Price, per 100 pounds.....\$3.25

No. 44M6107 Reinforcement for 7-Foot Posts. Made up of two pieces $\frac{1}{8}$ -inch wire twisted together, cut to length and straightened. Put up in bundles of 100 pounds, sufficient for forty-four posts.

Price, per 100 pounds.....\$3.25

No. 44M6108 Reinforcement for 8-Foot Posts. Made up of two pieces $\frac{1}{8}$ -inch wire twisted together, cut to length and straightened. Put up in bundles of 100 pounds, sufficient for thirty-eight posts.

Price, per 100 pounds.....\$3.25

No. 44M6109 Stirrups for placing reinforcement. About sixty-five to the pound. Price, 10 pounds for.....75c

These reinforcements are shipped from factory in CENTRAL NEW YORK.

METHOD OF ATTACHING WIRES.

To attach barbed wire, woven wire or any other wire fencing to concrete fence posts use short pieces of wire to bind with. Make a half hitch around the fence wire close up to the post. Then bring the tie wire around the post and complete the binding with a half hitch. To prevent the wires from slipping or giving, kink the fence wire a little on one side of the post.

TO ATTACH FENCING TO CONCRETE POSTS WITH SPECIAL WIRE TIE.

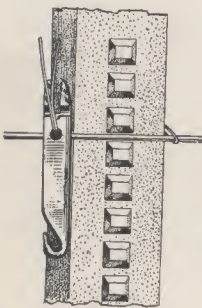


Figure 1.

We can furnish a simple device which enables you to attach fencing to concrete posts of any shape so that it will not slip up or down. This is superior and more convenient than the common method of making posts with holes for fencing or with a tie embedded in the post, which is liable to break off.

The illustrations show the method of using this tie in connection with a post made on our Triumph mold, but it can be used equally as well on any kind of concrete post.

First, take a piece of No. 12 or No. 14 wire long enough

to go around the post twice. Bend this piece of wire in the form of a hairpin and hook it over a line wire of the fence. Then bring it around the post and let it extend out in front of the post over the fence wires

on the other side. Insert both ends of the tie wire through the hole in the fence tool and from the back, sliding the tool up to the fence wire as shown in Figure 1. Next turn the tool upward so the tie wire coming from around post will pass through the forked end. If tool was

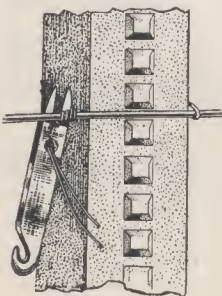


Figure 3.

pushed down on the tie wire far enough in the first position, the fence wire will now rest in small groove formed at the base of the fork and will appear as shown in Figure 2. By pulling forward on the tool and twisting it around the line wire the tie wire will twist tightly on the fence wire and hold it perfectly tight against the post as shown in Figure 3.

This tool will enable you to pull the tie wire so tight that it will be embedded in the corners of a square post or in the fins formed by the joining of a round mold.

No. 44M5898 Special Wire Fastening Tool.

Price, each, postpaid.....35c

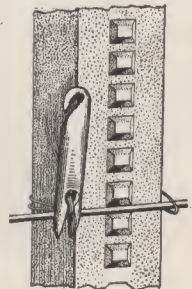


Figure 2.

CURING CONCRETE PRODUCTS.

The curing of concrete products is very important, because the final strength of the product depends entirely upon the thoroughness with which it is cured. If your materials are right in the first place and you use the proper proportions of cement, practically all your material and labor will be thrown away if you do not cure the products properly. A great many starting out in the concrete business have the idea that **curing** a product simply means **drying it**, but this is **absolutely wrong**. Cement or concrete requires a certain amount of moisture to insure perfect hardening. This moisture must be supplied either in the original mixture or before the dampness in the first mixture has entirely evaporated. In concrete work done in forms, such as foundations, sidewalks, etc., sufficient water is added to the original mixture for perfect hardening, but in making concrete products under the semi-wet process, which is the process used for making blocks, brick, tile, fence posts, etc., moisture must be supplied afterward. We recommend that a bed of wet cinders or wet sand be used on which to set the products when taken from the machine. This will keep the products from drying out while taking on the first or initial set. As soon as the product has set sufficiently to prevent washing the cement it should be sprinkled. When hard enough to be handled or taken off of the pallet or floor on which it was made it should be stored under cover, if possible, to be protected from drying winds and hot sun. Water should be sprayed on it two or three times a day, or more if necessary. Watch the materials closely and as soon as they have any appearance of becoming dry sprinkle them. A good method is to cover the products with wet straw, canvas or burlap, which will retain moisture for a long time and prevent the product from drying out quickly.

Remember that concrete products well made and badly cured are almost worthless. If you have taken care and used good material so far, don't spoil your work by careless curing. The slower the products dry out the harder and tougher and more waterproof they will be. As soon as the products become hard enough so that the water will not wash the surface, sprinkle them thoroughly. A light sprinkling is little better than none at all, because the water does not penetrate, but cures the surface only, leaving the center part uncured. This weakens the product to a great extent and makes it very liable to crack on account of the uneven hardness. Stack the product so that the water can be applied on all sides and be sure that sufficient water is used to soak it thoroughly. A sand, gravel or cinder floor is the best to use, and this should be kept thoroughly wet so that the products will be in a damp atmosphere. We cannot put too much emphasis on the fact that they must have plenty of water for the first ten to twenty days at least, to insure perfect hardness. To prove this to yourself make up two blocks from the same batch of materials, allow them to set for twenty-four hours in the same position and place and under the same conditions; take one of the blocks and put it aside without sprinkling for a week; take the other block and put it in a tub of water for about three days, then take it out, cover it with straw or canvas which has been thoroughly moistened, and allow it to dry out slowly for one week. You will then have two blocks of the same age, one that has been cured properly and one that has simply been dried. Take these two blocks, and, if possible, load them for a test, or, if you cannot do this, break them with a heavy hammer. You will find that it is a great deal easier to break the one that was allowed to dry out from the start than it is to break the one which was soaked in water. You will further find that the block which you dried quickly will absorb water almost as readily as a sponge, while the other will shed water as well as other building materials. While it will cost you a little more to cure the blocks thoroughly this money will be more than made up by the extra profits and extra business you will get when it becomes generally known that you are turning out a perfect concrete product. After the products once become hard or after they are twenty-four hours old do not be afraid that they will get too much water, because the more they get the first ten days the better.

Remember, **water is cheaper than cement**. A concrete product made of a mixture of one part cement, two parts sand and four parts of gravel, properly cured with sufficient water, will make a stronger product and one that is more waterproof than a product made of one part cement, one and one-half parts sand and one and one-half parts stone or gravel improperly cured by not

being watered sufficiently. Don't be afraid you will drown the cement after the product has become hard. Too much water applied to a concrete mixture made for pouring will impair the setting qualities by what is called drowning the cement, but water applied after the concrete has become hard enough to move will only make it harder and stronger. We again repeat, **use plenty of water on your products when hard enough to handle.**

STEAM CURING.

Some of the large concrete product factories are provided with necessary equipment for curing by steam. When making concrete materials on a large scale it will pay to install steam curing equipment, as experiments have shown that concrete products cured by steam for forty-eight hours are as strong or stronger than products cured in the ordinary way from thirty-five to forty days. Steam curing also has a tendency to bleach the products. This demonstrates the great saving in time and you will readily see that it is a profitable investment. To rig up a steam curing plant, construct a building large enough to hold a forty-eight hour output. Make this building with few openings, so that it will be possible to close it practically airtight. It should be constructed of concrete block or brick with a sloping felt roof. If a metal roof is used it should be so built that the moisture formed on it by condensation of the steam will run down on the sides instead of dripping on the concrete products. Run steam pipes under the floor with openings at equal intervals so that it will be an easy matter to fill the room with steam by opening a valve located on the outside of the building or room, as the case may be. Exhaust steam can be used, or if you do not have any steam machinery, provide a common boiler of about 2 or 3-horse power. The steam to be run in the room should be moist steam and not superheated or dry, the idea being to fill the room with a moist vapor. You can operate a steam curing room without a boiler by placing several gas or gasoline burners in the room. Place over these burners plates of sheet iron and above these a large tank which can be filled with water from the outside, or which will hold enough for twenty-four hours, dripping slowly onto the plates of iron. When the iron becomes heated the water should be allowed to drip slowly on the hot plates, turning it to steam as soon as it touches the iron. Stack the blocks or product in your steam kiln so that there is a space between the pieces. If you have cars in your yard run the cars right into the room from the machines. When the blocks are about twelve hours old close up the steam room tight and turn on the steam, leaving it on for eighteen to twenty-four hours. It is well to leave the products in the steam room after you have turned off the steam until they are partly dry. By dividing your steam curing building into four rooms it will enable you to steam cure continuously by allowing the products to remain in three of the rooms while the fourth is being filled.

MAKING CONCRETE PRODUCTS IN COLD WEATHER.

Concrete products can be made in freezing weather if so desired. The only precaution necessary is to keep the product from freezing until it is a few days old, in order that the initial set of the cement can take place properly. This statement, while contrary to general belief, has been proven time and again, and if you wish to continue operations during the winter simply provide shelter enough for about two days' output in which to store your products until the cement has taken the initial set. It is not necessary to have the storage room very warm, a temperature of about 10 degrees above freezing point, 42 degrees Fahrenheit, being sufficient.

Some authorities advocate the use of salt or sodium chloride in the water used for mixing concrete. We do not recommend this practice, however, because the addition of the salts weakens the product and in nearly every case will cause a white or salty appearing coating, called **efflorescence**, to form on the product. This efflorescence is also formed when mixing concrete with water containing alkali.

If there is any possibility of the aggregates, such as sand, stone or gravel, containing frost or snow they should be thoroughly heated to expel this frost before being used. The water should also be warmed. This heating the

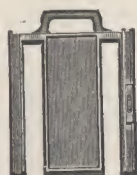
materials not only prevents any possibility of a weak product on account of frost, but it hastens the set of the cement, which is otherwise very slow in cold weather.

TRANSPORTING CONCRETE PRODUCTS.

When transporting concrete products any distance over rough roads it is well to protect them with straw or hay in much the same manner as fine pressed brick are protected. The jolting around over the roads is liable to break off the corners or edges, spoiling the appearance of the product.

LAYING CONCRETE PRODUCTS.

When laying concrete products it is necessary that just as much care be taken as in laying clay brick or stone products. However, it is a little easier because the block, brick or other products are more uniform in size. For laying concrete blocks we strongly advise the use of a mortar gauge, whether you are experienced in this kind of work or not. With the mortar gauge it is only necessary that you get your foundation and the first course of blocks level, after which the gauge will insure a level and perpendicular wall from start to finish. Not only this, but the mortar gauge will save time and mortar, besides keeping the face of the blocks clean.



Vertical Mortar Gauge.



Horizontal Mortar Gauge.

The above illustrations show our Triumph Mortar Gauges, which we highly recommend for quick and accurate work in the laying of concrete blocks, brick, etc. A horizontal gauge is used to spread the horizontal lines of mortar on the top of the blocks. Simply place the gauge on the block or wall, pressing the flange against one side of the wall or block, then fill the openings with mortar, strike it off with a trowel and remove gauge. This will leave two lines of mortar of an even thickness the length of the gauge, which is 16 inches. It sometimes proves to be a great help to spread the lines of mortar over several blocks and then going back and laying the blocks on these lines of mortar, spreading the mortar on the ends of the block with a vertical gauge as the blocks are laid. The vertical gauge is used in practically the same manner as the horizontal gauge and its use insures an even mortar joint and a great saving in the quantity of mortar used. By placing the vertical gauge lengthwise on the top of the block with the level upward, a glance will enable you to prove whether your blocks are being laid level or not.

Always be sure to clean the gauges when through using them for the day, so mortar is not allowed to set and harden on them, which will have a tendency to destroy their accuracy. You will find that these gauges will more than save their cost on your first job, and we would advise you by all means to add them to your equipment.

PRICE LIST OF TRIUMPH MORTAR GAUGES.

Each set consists of one horizontal gauge, one vertical gauge and one reversible handle.

No. 44M5694 Triumph Mortar Gauge, for laying blocks 8 inches thick. Shipping weight, 6 pounds. Price, per set.....\$ 4.95

No. 44M5695 Triumph Mortar Gauge, for laying blocks 9 inches thick. Shipping weight, 7 pounds. Price, per set..... 5.95

No. 44M5696 Triumph Mortar Gauge , for laying blocks 10 inches thick. Shipping weight, 8 pounds. Price, per set.....	\$6.40
No. 44M5697 Triumph Mortar Gauge , for laying blocks 12 inches thick. Shipping weight, 10 pounds. Price, per set.....	6.90

Shipped from factory in CENTRAL OHIO.

MORTAR.

Mortar for laying concrete products may be of different qualities, depending upon the workmen preparing it and the kind of material at hand. A very good mortar to use, one which we recommend, is made up of one part of cement and two parts of clean sharp sand run through a 1-16-inch screen to do away with all large particles of gravel, and one part of slaked lime. Use enough water to make a smooth paste, but be careful not to get it too thin. This should be mixed in about the same manner as common mortar. It is easily spread on the top of the blocks or buttered on the ends. If you do not use the mortar gauge be sure to use sufficient mortar on the bed to permit the block to adjust itself to the proper level, and butter the ends sufficiently to close the joint. Another good mortar to use is one made up of one part of cement and one to two parts of fine, clean sharp sand. Mix this about the same as common mortar and use as directed above for the lime mortar. This mortar will set just as hard as the concrete product and will bind the parts together, making a very strong wall. The lime mortar is not so strong as this and we therefore recommend the sand and cement mortar for use in laying up walls which will be subjected to internal pressure, such as for silos, grain elevators or tanks.

Before laying concrete products sprinkle them thoroughly, which will prevent the products from absorbing moisture from the mortar, which would weaken the bond between the product and the mortar.

BEADING MORTAR JOINTS.

Mortar joints on concrete block work should be beaded the same as on stone work to secure a finished appearance when building or wall is completed. The style and color of the bead depends entirely upon the taste of the builder. Mortar for beading should be made up of one part cement, two parts of lime putty and one part of clean sharp sand; mix rather thin so that it will be soft and pliable and conform to the shape of the beading tool used in making the joint. If beading is to be colored add the coloring to the cement or to the lime putty, mixing thoroughly to secure an even color. When using our mortar gauges for laying blocks just enough space is left in the joint to provide a bond for the bead.

REINFORCED CONCRETE BLOCK WALLS.

To make a solid reinforced concrete block wall lay the blocks in a rich cement mortar as directed on page 36. When laying the blocks put a long rod or wire to bind the wall together lengthwise between every other course. Then insert rods or bars of iron in the core openings and fill the core openings with a thin mixture of one part cement, two parts clean sharp sand and four parts gravel or crushed stone. Make this mixture thin enough to pour and then tamp it in place. It will facilitate matters to insert the reinforcing in 5 or 6-foot lengths instead of attempting to put the reinforcing in the core openings after the wall is completed. This will make an excellent wall for grain elevators, tanks, etc., where there will be considerable internal pressure. By this means you have the advantage of using concrete blocks and do away with the disadvantage and expense of lumber and carpenter labor, which would be the case if a solid monolithic wall were built.

PLASTERING.

Plastering directly upon the back of the block is practical provided the blocks contain a rich material for facing and the back of the block is made

with a semi-wet mixture. This condition can be easily met when using our face down machines with vertical drawn cores. To be absolutely safe, however, it is always advisable to give the finished walls a coating of waterproofing compound or use a waterproofing preparation in the facing. Some builders use waterproof cement for the facing material, which is a satisfactory method also. It is best to lath and fur for plastering, as this makes a dry inside wall positive. Even if your blocks are thoroughly waterproof you are liable to have a damp wall in cold weather when plastered directly on the back of the blocks, for the simple reason that all walls will be cold and will condense the moisture in the room. This is particularly the case with the kitchen or laundry, where considerable moisture is in the air, caused by cooking, etc. This condensation or sweat, as it is commonly called, is not moisture which has come **through** the wall, but it is moisture from the room and is gathered on the wall in the same manner that drops of water will gather on the outside of a watertight vessel containing cold water and placed in a warm room. When plastering directly on the back of the block it depends upon the condition of the wall as to whether one or two coats of plaster are required. If the blocks are uneven a light first coat of ordinary plaster, or what plasterers call the browning coat, should be put on the wall and then the finishing coat applied as usual. If the blocks are finished smooth on the inside an extra heavy finishing coat is practically all that is needed. As a rule the first coat of plaster should contain a small portion of cement to give it the necessary adhesive qualities to stick to the concrete block. Make up the finishing coat with portions of lime the same as ordinary plaster used in finishing a lime and sand first coat.

STUCCO WORK.



The above shows a concrete block house covered entirely with stucco plaster without any trimmings. This class of construction is preferred by some and makes a very handsome, plain structure.

Stucco work is cement plastering for the outside of any building and has been in use for many years. Up to the time of the first use of concrete building blocks as a building material stucco was applied to frame buildings and met with success when applied properly. Recently stucco has been applied to concrete block buildings for the purpose of breaking the monotony of using any one particular design in the construction of the building. In fact, it enables one to finish the concrete block building so that it will appear as a monolithic structure, without the expense of erecting forms for the entire building. Stucco is impervious to the weather and is durable, artistic and cheap in cost as compared with other finishes. With stucco you can have almost any desired finish in any color. The finishes most generally used are plain plaster finish, spatter dash finish and pebble dash finish.

MORTAR FOR STUCCO WORK. Make this of one part of good Portland cement, three parts of clean sharp sand and one part of slaked lime putty, thoroughly mixed together. Be careful not to get the mixture too thin or it will be difficult to apply.

TO APPLY STUCCO FINISH. If the building has been constructed of blocks with scratched surface, as described on page 24, no preliminary is necessary except to clean and moisten the wall as explained below. If the building is of regular concrete block, not being prepared for stucco work, it is necessary to go over the entire wall and roughen it by picking with a stone ax; then brush all loose particles of concrete from the wall.

MOISTENING. Before applying the stucco plaster it is necessary to sprinkle the wall and have it dampened thoroughly over the parts where you apply the mortar. If this is not done the stucco will not adhere properly to the wall and is liable to crack off. It is also necessary to make sure that you will be able to complete one side of the wall in the course of a day, as it is almost impossible to stop off at a certain part on the wall and start in again on the next day without showing a joint.

PLAIN PLASTER FINISH. After you have the wall cleaned and thoroughly moistened apply the stucco plaster with a trowel, the same as common plastering, to the thickness of $\frac{1}{2}$ to 1 inch, smooth it off with a wooden float and finish practically in the same manner as regular plastering.

Another method of applying this finish is by throwing it on with a trowel or large stiff fiber brush, then smoothing with a wooden float. If a rough plaster finish is desired cover the wooden float with burlap.

SPATTER DASH FINISH. Prepare the wall and moisten it as directed before, mixing the mortar of the same proportions but a little thicker. Throw the mortar on with a trowel or stiff fiber brush, but be sure to get it on evenly to avoid a lumpy appearance on the completed job. You cannot smooth this finish down with a trowel or float, as it will spoil the effect of the spatter dash finish. The thickness of the mortar in this finish should be from $\frac{1}{2}$ to $\frac{3}{4}$ inch.

PEBBLE DASH FINISH. The walls should be first prepared as directed for plain plaster finish and then a coat about $\frac{1}{2}$ inch thick should be applied. For the pebble dash finish prepare a mixture of one part of good Portland cement and three parts of clean sharp sand and pebbles mixed together, the pebbles to be no larger than $\frac{1}{4}$ inch in diameter. This should be mixed up thoroughly and thrown on with a trowel carefully, so as to apply an even coat and to avoid a lumpy appearance. Be careful not to get too much plaster on top of the pebbles, otherwise the pebbles will not show. To make the pebbles more prominent proceed as follows: It takes about ten hours in ordinary weather for the pebble dash coat to complete its initial set. About ten hours after the pebble dash coat has been applied go over the wall with a stiff fiber brush and brush away all excess mortar from the surface of the pebbles, and about forty-eight hours afterward wash the wall with water sprinkled from a hose or thrown on with buckets. This will wash away all small particles of cement which have adhered to the pebbles and will clean away the loose material on the wall, making the pebbles stand out prominently—a very handsome finish.

Another and probably a quicker and more desirable method is to go over the wall, twenty-four or forty-eight hours after the pebble dash coat has been applied, with a solution of muriatic acid and water, made up of one part muriatic acid and three to five parts water, to be applied with a soft brush. This will clean away the cement from around the pebbles, but care must be taken not to leave the acid solution in place too long or it will eat into the wall. As soon as the surface is cleaned properly the acid solution should be washed away with plenty of water.

Where an extra fine job of pebble finish is desired and expense is no object we have seen a handsome finish obtained by first applying a plain finish and then placing washed and selected pebbles into the soft plaster by hand.

SEASONING A STUCCO FINISH. To insure permanent results and a surface without cracks great care must be taken to keep a stucco finished wall thoroughly wet for three or four days; the longer the better. To do this it is usually the practice to build a light framework about 6 inches from the wall, cover with cheap cheese cloth, muslin, burlap or similar material and keep this moistened for several days. This keeps the sun from the wall, prevents rapid drying and insures proper seasoning.

COLORING FOR STUCCO FINISH.

There is big advantage in the use of stucco finish from the fact that it can be colored with a lasting color and can be applied in panels on different parts of the building, using various colors for the different panels and for the trim. This gives the brightness in appearance of a painted building, with the additional advantage of colors which are permanent and which will not fade out and require repainting in time to come. The coloring material should be mixed with the cement, and if you use our dry mineral colors you will get perfect results. These colors are described in full and directions for mixing given on pages 7 and 8.

Stucco finish on concrete blocks has not come into very common use, but as its possibilities are fast coming to the front it will be used more and more to the advantage of the concrete block manufacturer and cement contractor. It breaks up the monotony of the concrete block building, which is so objectionable to a great many. It can be applied so that the concrete block building will have the appearance of a monolithic structure without the expense of forms and expert labor for erecting them. It makes the walls impervious to moisture and the cost is about the same as stucco finish on a frame structure. By using stucco and concrete blocks in combination many handsome buildings can be designed. The illustration below and on page 39 and 42 show three types of buildings which have been finished by our method.



The above shows a concrete block house, the body of which was stucco plastered on concrete block, while the foundation is made of panel face concrete blocks and the belt course of scroll face concrete blocks. The window caps and sills were made on the Badger Adjustable Sill and Cap Machine, which is shown in our Concrete Machinery Catalog, and are of the vertical tooled face design. It gives you an idea of the possibilities when using our machines and our method of construction.

It is not advisable to apply stucco finish to a faced concrete block, as it does not adhere to the face as well as to the rough block. In fact, when applying it to a faced block it is necessary to roughen the surface thoroughly, as before stated. When it is known beforehand that the building is to be finished in stucco, make the blocks with a rough back, as explained on page 24, using a plain face plate in the machine, and make the facing in the usual manner. The face will form the inside of the wall and it will be a simple matter to plaster directly on the wall inside without using lath or furring strips.

As the stucco plaster is a rich mixture of cement and sand, and is applied in a wet form, it will waterproof the wall thoroughly. In extremely wet climates it is advisable to apply a coat of waterproofing compound on the stucco finish when completed. In Northern states it is always best to use furring and lathing to avoid sweating of walls in winter as explained on pages 38 and 39.

COST OF STUCCO WORK.

Stucco work can be applied to concrete buildings at a trifling cost. The original building can be built cheaply for the reason that an ordinary rough block having one mixture of material throughout can be used for the purpose. No facing is required, which saves a great deal of time and the extra cost of the cement required for facing. As a rule you will find that the extra expense required for making face block will more than cover the cost of stucco plastering the completed building made of common block. The finishing coat, which is the only coat required for stucco work on a concrete building, can be applied at a cost, including material and labor, on an average of 35 to 40 cents a square yard.



The above shows a concrete block house, the body of which has a stucco finish, and the trimmings, such as corners, foundation, porch, rail lattice, etc., are of rock face concrete blocks. The belt course is of a rope face design concrete block. The structure is a handsome one.

WATERPROOF QUALITIES.

The chief fault of concrete building blocks as ordinarily made is their tendency to absorb water. By following our suggestions in regard to proportioning and curing this objection can be overcome. However, in this respect they are better than sandstone or common brick, because these materials will allow water to penetrate and cannot be plastered without lathing and furring. A great many have plastered directly on the back of the block without waterproofing the blocks, with the result that the finished job was not satisfactory, and discouraged others from the use of concrete blocks as a building material. At the same time the walls should not be watertight, because in cold weather the moisture in the room will condense on the cold surface of the wall, causing it to sweat. If the wall is slightly porous this moisture will be absorbed and carried away gradually. Excessive water absorption may be avoided and good waterproof qualities be had in various ways as follows:

a. **The Use of Properly Graded Materials.** If the proportion of cement, sand, gravel or crushed stone used in your mixture is correct the resulting mass will be less porous than a block or product made from improperly graded materials. Plenty of coarse aggregate, such as stone or gravel, with enough fine material to fill up the voids, will make a better concrete than fine or coarse sand used alone with cement. Test and proportion your materials by the water test described on page 5.

b. **Use of Rich Mixture.** All concrete will absorb water under pressure to a certain extent. The richer the mixture in cement, the less the power of absorption. If more cement is used than is necessary to fill the voids in sand and gravel, a very dense concrete is made, which makes the absorption of water very slow. It is for this reason that we recommend a rich facing material in making blocks, brick, etc. It would cost too much to make blocks completely of a rich mixture.

c. **Use of a Wet Mixture Partition in the Block.** When blocks are made face down, and particularly when the cores are withdrawn vertically as on our machines, after the face material is put in and the cores have been entered, it is a simple matter to put some very wet mixture into the opening between the cores and the ends, then fill in and tamp the balance of the flask full of the regular semi-wet mixture. This will give you a layer of dense concrete across the center of the block, which prevents moisture from passing through the web in the center, while the air spaces will effectively prevent the passage of moisture from the front to the back wall.

d. **Use of Waterproof Compounds.** There are several compounds on the market which can be mixed with the cement, and there is prepared waterproof cement that can be used for the facing material, which makes the blocks practically waterproof at but a small additional cost. Should you purchase a waterproof compound to mix with your facing material be sure that you get it from a reliable manufacturer and buy a brand which has been proved to be permanent in its effect. Some materials have been sold for waterproofing which were effective only for a few days, exposure to the weather destroying the waterproof quality entirely.

We can furnish the well known Medusa Waterproofing made by the Sandusky Portland Cement Company at price listed below.

This waterproofing is a patented preparation in the form of a fine white powder which is mixed with the dry cement before the addition of sand, water or coloring.

Two pounds of this compound thoroughly mixed with one sack of cement will make a waterproof cement. This waterproofed cement mixed in the proportion of one part waterproof cement to three or even four parts of sand will make a waterproof facing mixture that will actually turn water. Waterproofed blocks should be laid up with waterproof mortar.

To make this either of the mortars described on page 38 should be made up with cement that has waterproofing added to it in the proportion of 2 pounds of waterproofing to one sack of cement.

Medusa Waterproofing Compound is put up in 40-pound sacks and is shipped from the mills located at Bay Ridge, Ohio; Syracuse, Indiana; York, Pennsylvania, or Dixon, Illinois.

No. 44M6150 Medusa Waterproofing Compound.
Price for 40-pound sack.....\$4.25

e. **Application to Surface After Erecting.** There are various washes that can be applied to the finished structure which seal the pores of the concrete and make it waterproof. An effective wash is to paint the outside of the building with a thin coat of a solution of cement and water. Put it on very thin, however, because if too thick it will show hair cracks.

FIREPROOF QUALITIES OF CONCRETE PRODUCTS.

Advocates of other than concrete building material claim that concrete block construction is not fireproof. However, it has been proved beyond all doubt that concrete blocks properly made and cured are more fireproof and withstand the action of prolonged and intense heat, in addition to sudden changes caused by water sprayed on them while hot, much better than any other known building material.

There is a large number of cases on record where concrete block buildings have been completely gutted by fire, but the walls were uninjured and the same walls were used for restoring the building. Other instances are known where a concrete block building successfully withstood the heat and flames of other surrounding buildings and also protected the contents of the building in spite of the fact that the building was surrounded by fire and freely exposed to it.

A block with a gravel aggregate is considered by some authorities to be more fireproof than one in which crushed limestone has been used as the aggregate, because the limestone will burn and become lime.

TO ESTIMATE THE COST OF CONCRETE WORK FOR A BUILDING.

Portland cement is usually packed and sold in sacks of 95 pounds or in barrels of 380 pounds, or four sacks. Sand, gravel and crushed stone are usually sold by the cubic yard. The quantity of concrete which a given quantity of cement, sand and gravel will make depends on the proportions of each material and on the size of the grains of sand and gravel or crushed stone. In making a mixture of concrete the aim is to fill the spaces or voids between the grains of sand with cement and in turn to fill the spaces between the gravel or crushed stone with this cement and sand mixture. On page 5 we tell you how to test the materials you use so you may know the exact quantity of each

required to make this ideal mixture. However, for the purpose of calculation and for all ordinary work, a mixture composed of one part cement, two parts sand and four parts gravel or crushed stone, which is called a 1:2:4 mixture, will answer and will make a first class product.

To make a cubic yard of concrete of 1:2:4 mixture will require:

- 1½ barrels Portland cement,
- 2/5 of a cubic yard of sand,
- 4/5 of a cubic yard of gravel or crushed stone.

These figures are as close as can be given in common fractions, and you will find that as a general rule the amounts specified above will make more than a cubic yard of concrete, and your products will actually cost less than what you figure they will when using our figures as a basis. This is a radical departure from the method commonly used, in which the estimated cost is nearly always less than the actual cost.

The prices of material and labor vary in different localities, so in addition to figuring an average cost we also tell you how much material and labor is required for various products, which will enable you to figure your own costs, basing your figures on the cost of materials and labor in your locality.

Product	*Average Cost, Each	Average Selling Price	Quantity a Cubic Yard of Concrete Will Make	Number Two Men Will Make in 10-Hour Day
8x 8x16-Inch Concrete Blocks	8c	\$0.15	72	200 to 250
8x10x16-Inch Concrete Blocks	9c	.20	53	190 to 230
8x12x16-Inch Concrete Blocks	11c	.24	44	175 to 225
Sill or Cap, 10 inches wide, 8 inches high, 5 feet long	48c	1.00	9¾	50
8x16x16-Inch Chimney Blocks	18c	.35	28½	100
Porch Column Sections, 10 inches diameter, 12 inches high	10c	.25	50	125

*By average cost we figure on a basis of \$2.00 a barrel for cement, 75 cents a cubic yard for sand and gravel and \$2.00 a day of ten hours for labor.



To arrive at a very close estimate as to the cost of the completed building first ascertain the number of blocks that can be made on a machine with a required amount of help and a given time. This will enable you to figure your labor expense per block. Next ascertain from the cost and quantity of materials required the total cost of the cement, sand and other aggregates used in the block or product. Third, ascertain the cost of handling the product, such as bearing away from the machine, expense of curing, etc., including the cost of laying it in the wall; to this cost a certain per cent must be added for cartage, if any; damage due to breakage, wear and tear of machinery, etc. Then ascertain the number of blocks required in the completed building. This can be easily done. Add together the length in feet of all the walls of the building. Multiply this by the height in feet, which will give you the number of square feet of wall surface. Then add together the total number of square feet of surface in all door and window openings, and subtract this sum from the square feet of wall surface. The result will give you the net area of wall surface to be built of blocks. Divide this by 100 to ascertain the number of squares of 100 square feet in the wall surface. It takes 112½ blocks with 8x16-inch face, or 75 blocks with 8x24-inch face, to make 100 square feet of wall. Multiply the number of squares of 100 square feet each by 112½ or 75, depending on the size of block you will use, and the result will be the number of blocks required. This result multiplied by what it costs you to make a block will give you the total cost of the block work in the building. Do not fail to include in your figuring the cost of laying the blocks if you do your own block laying. It is practically impossible for us to give you the cost of blocks to cover all localities on account of the difference in cost of material and labor. On an average, however, by using our machinery,

which is known to be labor saving, you can make an 8x8x16-inch block with a 1 to 2 face mixture, or very rich facing, and a 1 to 6 back mixture, which is a good backing material, at a cost of about 7 to 9 cents each. Labor is an important item to consider in cement block production. It is therefore a matter of economy to use a machine that will enable you to turn out the most product with the least time and labor. There is no hand machine on the market that we know of to excel our Wizard Concrete Block Machine for speed. One man can make on an average 100 blocks a day, and figuring the average cost of labor at \$2.00 a day will bring the cost of the labor on 100 blocks down to 2 cents each. Two men can work the machine to much better advantage, increasing the output to 200 to 250 blocks a day, thus reducing the labor expense proportionately. In equipping your plant arrange your machinery and your material supplies so that but little handling will be necessary. For instance, locate your various machines so that they will be convenient to your mixing bed, or if you employ a number of men have a mixing bed for each machine. Pile your material and store it in bins close to the mixing beds so that little handling is necessary. It will pay to provide a concrete foundation for your machines when permanently located. This will prevent machines being racked out of adjustment and will save a great deal of wear and tear.

STRENGTH OF CONCRETE PRODUCTS.

There seems to be a great deal of doubt in the minds of many as to the strength of concrete products. In compressive strength a well made concrete block does not differ greatly from ordinary building stone. Below we give the average compressive strength per square inch of well known building stones and of concrete as stated by various authorities:

Limestone	7,792 pounds
Sandstone	5,831 pounds
Gravel Concrete	5,500 pounds
(1 part cement, 1.6 parts sand and 2.8 parts gravel.)	
Gravel Concrete	5,050 pounds
(1 part cement, 1.6 parts sand and 3.7 parts gravel.)	
Stone Concrete	3,904 pounds
(1 part cement, 2 parts sand and 4 parts crushed stone.)	

These concrete tests were all made on specimens one year old. Actual tests of compressive strength of hollow concrete blocks are difficult to make, it being impossible to apply a load over the whole surface because a block 16 inches long and 8 inches wide would bear a load of from 150,000 to 200,000 pounds, more than the capacity of any but the very largest testing machines. Well known authorities claim it is safe to estimate the strength of a well made block made of a 1 to 5 mixture, which is one part of cement to five parts of sand and gravel or crushed stone, at 1,000 pounds per square inch at one month and 2,000 pounds at one year. For example, we will assume the use of a block 12 inches wide and 24 inches long, which is a total surface of 288 square inches, deducting one-third for core openings, leaving a net bearing surface of 192 inches. A block 9 inches high weighs 130 pounds; assuming a strength of 1,000 pounds and a factor of safety of 5, the safe load will be 200 pounds per square inch, or 38,400 pounds for the whole surface of the block. From these figures we can determine that 295 such blocks could be placed one upon the other, making the total height of wall 222 feet, and still the pressure on the bottom block would be less than one-fifth of what it would actually bear. From this you can readily see that there is a large margin of safety and that concrete building blocks properly made are as good a building material as can be obtained.

GENERAL HINTS.

The success of the concrete building block industry depends to a great extent on the low price of product, because it is necessary to compete in price with common brick and rubble stone. It is not generally known among users that well made concrete blocks are superior to either of the above for building purposes even though the cost were the same. We would therefore recommend

everyone who is in the concrete block business to advertise the fact that concrete blocks are not only cheaper but more durable than the commonest forms of building material, and we are quite sure that the business will be on the continual increase with a corresponding increase in profits.

Construct the building you are working in of concrete blocks; in fact, use concrete products wherever you can for your own purpose, which will advertise the fact that you have enough confidence in concrete to use it for your own work. Make up sample walls in the various designs or in combination of designs, building these on the prominent points of your premises, so that they will be seen by people passing by.

In another part of this book we have already given you particulars regarding the cost of concrete products, and if you will compare the cost of a concrete block wall with the cost of a stone or brick wall, using a cubic foot as a basis of figuring, you will easily see that the concrete is cheaper, besides being the better material. Explain all these facts in any advertising matter you get out, and if you make a good line of blocks there is no question but what you can introduce the blocks in your locality to such an extent that they will almost entirely supersede the old forms of building material.

It would naturally be expected that concrete blocks would quickly take the place of the old types of material; as a matter of fact the block industry has not grown as fast as it should. Architects and builders have opposed it and it has met with a great deal of opposition on the part of the home builder. We think the main drawback to the industry is the fact that there have been so many people making blocks in one design only, who have not used the proper materials or who have not cured the product properly, with the result that it did not give the satisfaction it should have given, because the work was improperly done and the building far from pleasing. To overcome this opposition you must make your blocks perfect in every respect and use the handsomest designs you can procure. We have already gone into the matter of how to make a perfect block, and if you will follow out our directions there will be no question on this point. A good block should be hard and dense and will give out a ringing tone when hit with a hammer. If the blocks sound dead when struck and break easily with an earthy fracture the materials were either dirty or improperly proportioned or insufficient moisture had been used in curing. Don't turn out poor blocks for the sake of saving a few cents in the cost. This is poor business policy. Use your concrete as wet as you can and supply sufficient moisture in the curing; in fact, take every precaution possible to make a perfect product, and even if you ask a little more than your competitors, if you advertise the **quality** fact we know the business will come your way.

Architects all over the country, as well as other persons of taste and judgment, have made a great many objections to concrete blocks, the main one being the monotony in the appearance of the wall when completed. This is due in almost every instance to the use of one rock design throughout the entire building. Rock face block is an imitation of the cheapest form of quarry stone, and the fact that no two stones ever have a face alike, while the face of the blocks is exactly alike, makes the imitation stand out more prominently. If you use several different rock designs mix up the blocks in the wall, inverting some of them; in this way monotony to a great extent is relieved, and if you use good sharp plates such as we furnish the finished wall will have a better appearance. It is also advisable to get away from the imitation entirely and avoid giving the finished work the unnatural appearance of the rock face. We believe that if the smooth face, tooled face, panel face and tooled marginal bush hammer faces were used more than they are there would be a big increase in the use of concrete blocks as a building material. These patterns do not smack of the imitation, are very good and if used in connection with rope or scroll face blocks for belt courses or cornice work will make a handsome building. In addition 4-inch course blocks can be used in combination with full size blocks, which will relieve the monotonous appearance and beautify the wall a great deal. See the front pages of this book or our Special Concrete Machinery Catalog for illustrations of the many handsome designs and special attachments for block machines which we can furnish. If we can be of any service to you in your work we will be very glad to answer any questions you may have to ask and give more information on anything pertaining to the concrete product subject.

CARE OF PALLETS.

Keep your pallets clean and well oiled. If of metal, the blocks will release easier and the oil prevents rusting. If of wood, go over your entire stock of pallets occasionally and reject all warped pallets. Keep wood pallets well cleaned and oiled, varnished or shellacked to preserve them. They should be made as near waterproof as possible to prevent warping or swelling from moisture. Sometimes moisture will cause wood pallets to swell to such an extent that they will not fit in the machine properly, resulting in broken or poorly shaped blocks. Do not make the pallets so thick that they are a tight fit in the machine when new and dry.

DIFFICULTIES YOU MIGHT HAVE AND HOW TO OVERCOME THEM.

CRACKED BLOCKS. This might be due to one or several reasons. It will be necessary to carefully investigate and locate the cause and remove it. This you should easily be able to do by means of the following:

First—The material used in the construction of the block must be mixed right. The facing material should be semi-dry. Mix one part cement to two parts fine sharp sand, as explained on pages 6 and 7, sufficiently dampened so that the mixture will adhere in a mass when squeezed in the hand without showing moisture on the surface of it. The backing or coarser material should be mixed one part cement to from four to six parts sand or gravel, as explained on pages 5 and 6. After this has been thoroughly mixed add water and mix to make the dampness uniform throughout. It should be moist enough so that it will hold together in a mass when squeezed in the hand and bring moisture to the surface of it. If you do not get your mixture wet enough it will crumble, or if too wet it will be sloppy and will run.

Second—When tipping the flask after having the block made, or when lifting the back wall and end gates away from the block after the release, be careful to let the flask down easily to avoid jarring the machine, as the block has not stood long enough to be thoroughly set and the least jar will break it.

Third—If the block breaks at the corners it is caused by your not throwing the end gates back far enough away from the end of the block, which allows the core projection on the end gate to knock off the corner. There is about $\frac{1}{4}$ -inch clearance between the end gate and the corner of the block when the end gate is opened back as far as it will go before turning flask back.

Fourth—If you tamp your facing material before putting in the backing it will sometimes cause the face to separate from the back, because the backing material has not properly united with the facing material.

Fifth—If you tamp the block between the cores too hard there will be an expansion when the block is released, which will cause the block to crack. You should not be afraid you are tamping too much, however, as not tamping enough will cause the same trouble. It is very seldom that a block breaks on this account. If it does, try tamping it more or less, as the case may be, and see how that works. Tamping with many light blows is more effective than a few hard blows.

Sixth—If the block does not crack or break until flask is turned and released, most likely a warped pallet causes the trouble. If a pallet is warped all four corners will not bear on the front wall, and when locking the machine or tamping the block it will be forced to an even bearing. When the machine is opened the pallet springs back into its warped shape, with the result that the block breaks. This same trouble might happen if wood pallets are made to fit too tight. When wet they will swell, and then either the pallet or the mold box will spring and crack the block. Discard warped pallets, because you cannot make a perfectly shaped block on them.

Our Knox and Wizard Block Machines are provided with means for adjusting the pallet support, and you should keep this in shape so the pallet bears evenly on all corners.

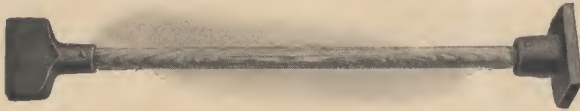
Don't try to patch up or use a cracked block. As soon as you see the block has cracked, if the material has not yet hardened or is not more than an hour or so old, work the material over and make a good block. Don't take chances of spoiling your business by furnishing poor blocks to your trade; it does not pay.

LACK OF SPEED.

When first starting to use the machine see how slowly you can make the blocks and make them right. Make each movement slowly and easily, being careful never to jar the machine, and as you become accustomed to handling it you will learn to pull the flask forward, release and throw it back without any jar and yet do it quickly. A concrete block machine is like every other machine, in that the operator must become familiar with it before he can get the best results.

As you become more familiar with the handling and mixing of the materials and the operation of the machine you will be able to greatly increase your speed, and you will in a short while be able to turn out twice as much work with half the effort exerted on your first day's output.

TAMPERS.



Extra tampers for making blocks and other products. Well made of No. 1 gray iron castings, nicely finished and securely mounted on hard-

wood handles. We have two sizes. Be sure to order correct size.

No. 44M5676 Regular Double End Tamper. Blunt end measures $2\frac{3}{8}$ inches wide and $\frac{1}{2}$ inch thick; large end measures $2\frac{1}{2}$ inches wide and 4 inches long. Weight, 5 pounds. Price.....75c

No. 44M5677 Extra Heavy Double End Tamper. Blunt end measures 4 inches wide and $1\frac{1}{2}$ inches thick; large end measures $3\frac{3}{8}$ inches wide and $4\frac{1}{2}$ inches long. Weight, 9 pounds. Price.....\$1.00

All tampers shipped from factory in CENTRAL OHIO.

MARK YOUR BLOCKS.

In many localities the law requires a block maker to put his initials or some mark of identification on his blocks. We have designed a simple yet efficient way of doing this in the stamp here illustrated. The letters are 3 inches high, of plain block type, designed so they will mark the concrete and withdraw easily and leave a perfect impression. Can be furnished in stamps of single letters, as shown, or will make one stamp of two, three or four letters. Mention which is wanted when ordering, otherwise will furnish all on one stamp. Letters are reversed so they will show properly when impressed in the block. Weight, single letter stamp, 4 pounds. Additional letters will add about 2 pounds per letter. When ordering, carefully print letters desired so no mistake will be made.



No. 44M5807 Block Marking Stamp. Price, per letter.....45c
Shipped from factory in CENTRAL OHIO.

LET OTHERS HAVE THE BENEFIT OF YOUR EXPERIENCE.

This book was compiled for the benefit of our customers, the end in view being to help them succeed in making concrete products of all kinds. All the information herein was obtained by practical experience. If you have found any particular method or system of handling your materials that has proved a labor saver, help us help the other fellow by sending us a description and picture, if you have one, of your method or device, so we can publish it in our next edition.

We are always interested in knowing what our customers have done with machinery bought from us. If you have any photographs of buildings, barns, shops, foundations or houses of any sort, built of products made on machinery purchased from us, and care to send them to us, they will be greatly appreciated.

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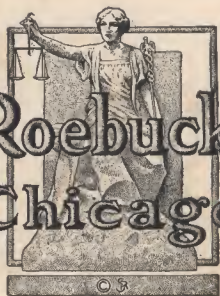
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